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JVC Service Manual

COMPONENT SPECIAL EFFECTS GENERATOR

MODEL KM-3000

VICTOR COMPANY OF JAPAN, LIMITED

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

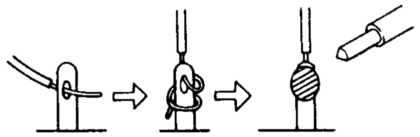


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

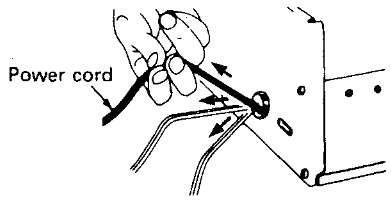


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

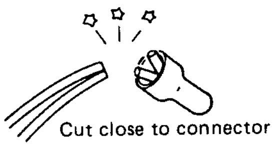


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

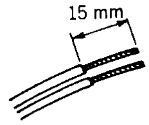


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

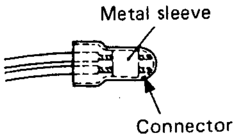


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

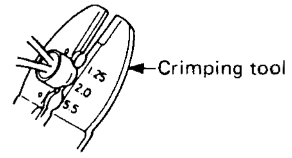


Fig. 6

(5) Check the four points noted in Fig. 7.

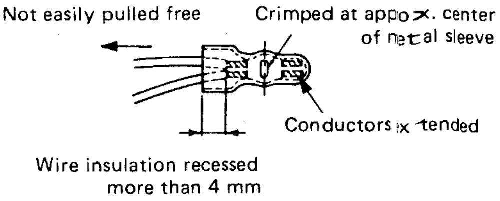

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

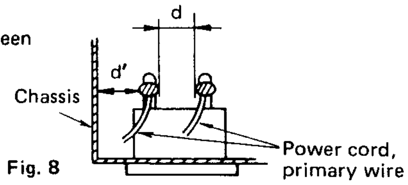


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
   Measuring Method: (Power ON)
   Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

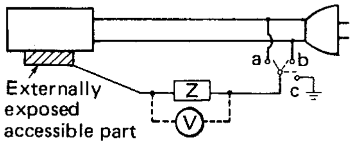


Fig. 9

5. **Grounding (Class I model only)**
   Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
   Measuring Method:
   Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

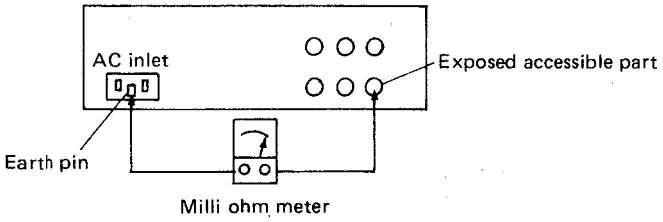


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

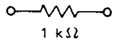
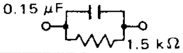
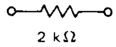
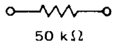
AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	 1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	 0.15 µF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	 2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		 50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

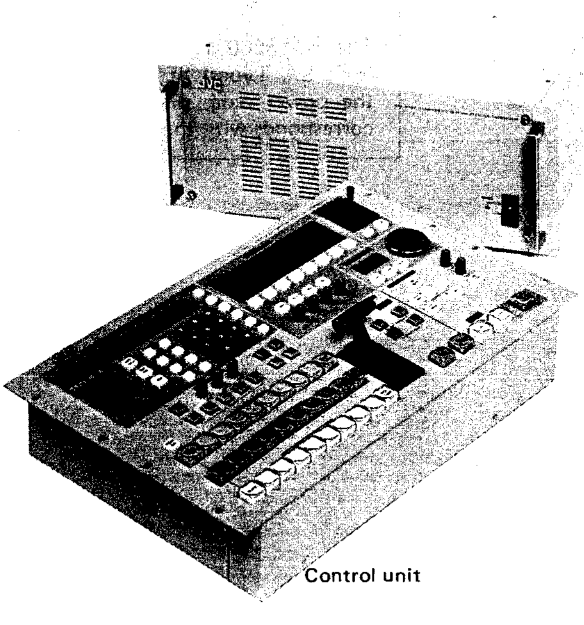
Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

JVC Instructions

COMPONENT SPECIAL EFFECTS GENERATOR

KM-3000



For Customer Use:
Enter below the Serial No. which is located on the rear panel. Retain this information for future reference.

Model No. KM-3000

Serial No.

WARNINGS

Due to design modifications, data given in this instruction book are subject to possible change without prior notice.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

AVERTISSEMENT:
POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A L'HUMIDITE OU A LA PLUIE.

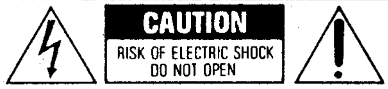
Warning Notice
FOR YOUR SAFETY

To ensure safe operation the three-pin plug supplied must be inserted only into a standard three-pin power point which is effectively grounded through the normal household wiring.

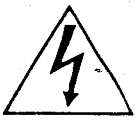
Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth ground. Wrongly wired extension cords are a major cause of fatalities.

The fact that the equipment operates satisfactorily does not imply that the power point is properly grounded and that the installation is completely safe. For your safety, if in any coubt about the correct grounding of the power point, consult a qualified electrician.

For U version



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For E version

WARNING – THIS APPLIANCE MUST BE EARTHED
IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW:	EARTH
BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

CAUTION!
CHECK YOUR LINE VOLTAGE.

The KM-3000 has been preset for a line voltage of 240V (EK, EA Types) or 220 V (EG Type). Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area.

Thank you for purchasing the JVC KM-3000 Component Special Effects Generator.
To utilize this product to its fullest, please read this instruction booklet carefully and entirely for the best understanding of its capabilities and operation.
E (EA, EG, EK) type for PAL model, U type for NTSC model.

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FEATURES

- **An eight-input component special effects generator**
  All eight inputs are compatible with component signals (Y, R-Y, B-Y). Three of the inputs (INPUT 6, 7 and 8) can accept RGB signals through internal switching.
- **Outputs in three signal formats**
  In addition to three component signal outputs (PROGRAM x 2, PREVIEW x 1), the KM-3000 offers outputs in composite (PROGRAM, PREVIEW) and separate Y/C signal (PROGRAM) formats. This allows the unit to be connected to existing systems.
- **Auto and manual effect**
  Special effects, downstream keys (DSK), and fade to black can be operated either automatically or manually. Effect time in the automatic mode can be set to 0 to 999 frames with a rotary dial or by using the 10-digit keypad.
- **VTR editing controller interface**
  A General Purpose Interface (GPI) is provided as well as the standard RS-422 port, which allows the KM-3000 to be operated with a wide variety of production equipment.
- **Various functions**
  A soft-chroma key provides more natural keying, and external and luminance keys can also be accommodated. In addition, the color-matte generator is included for use in conjunction with the border, background color, and downstream keys. The unit has a built-in memory that can store up to 16 events and 24 colors.

OTHER FEATURES

- Border wipe.
- Color bar generator.
- Black signal generator.
- 23 Wipe patterns.
- Switchable wipe directions: normal, normal reverse, and reverse.
- Two KEY inputs with independent BNC connectors for INPUT 7 and 8, allowing keying and DSK with video or key signals from external sources like a character generator.
- Variable aspect ratios for horizontal and vertical.
- Masking of key inputs with wipe patterns.
- PROGRAM-2 output that can be switched to a KEY BUS signal output – allowing connection to a DVE.
- GENLOCK input for synchronization with external systems.

PRECAUTIONS

Safety Precautions

- Do not modify the unit or operate it with the cover panel removed.
- Do not allow inflammable objects, water or metallic objects to get inside the unit as it will cause damage or malfunction.
- When not to be used for a long period of time, be sure to disconnect the power cord from the power outlet.
- When there is any abnormality (noise, smell, smoke, etc.) with the unit, immediately switch off, disconnect the power cord from the power outlet, and contact your nearest JVC-authorized service agent.

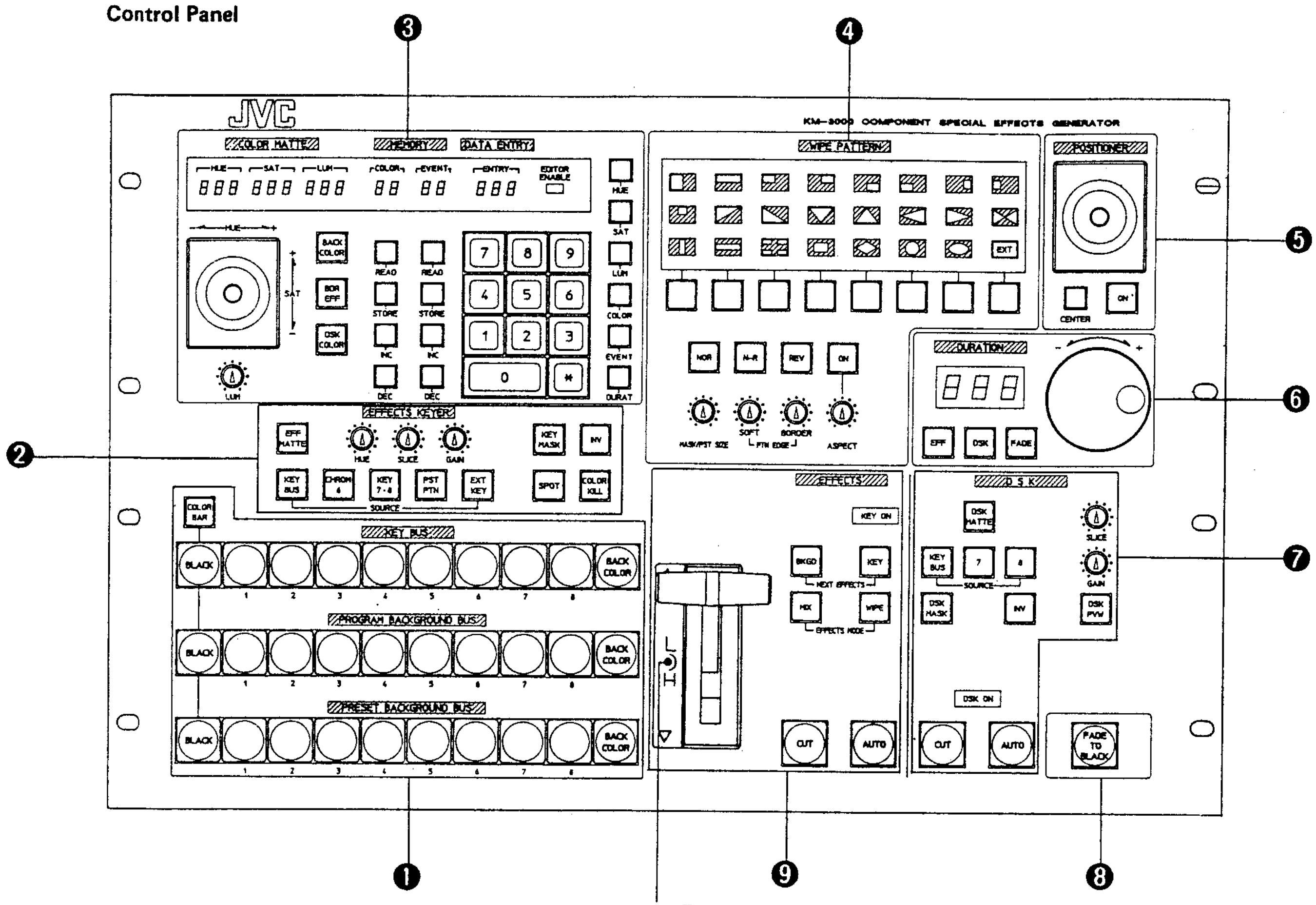
Handling Precautions

- A cooling fan is provided in the rear panel.
  When mounting the unit in a rack, etc., assure sufficient ventilation space at the rear.
- For an extended service life, avoid using the unit in a place subject to extreme temperatures, high humidity, strong vibrations, excessive dust, or in a place near the source of noise.
- Avoid strong vibrations and shocks when installing or carrying.
- Do not apply strong force to the fader lever or handle it violently.
- The standard positioning of the control panel is horizontal. Never lean it by more than 45° from the horizontal.
- The video output signal (component) of the KM-3000 conforms to the specifications of MII video recorders.
  Internal modifications and adjustments (fee is charged) are necessary to obtain video signals conforming to other standards.
- When the power is switched on, the settings of all controls on the panel correspond to those obtained when they are turned fully counterclockwise, regardless of their physical positions. If the controls are moved, new settings corresponding to their physical positions are obtained. Similarly, when the power is switched on, the FADER lever is treated as being pushed all the way up or down, wherever it may be positioned.
- When the power is switched off even for a moment, the settings of all the controls are cancelled and reset to their original (settings obtained when the power is switched on). If the unit should be used where power supply conditions are not stable, it is recommended that a backup power supply be used.

CONTROLS, CONNECTORS AND INDICATORS

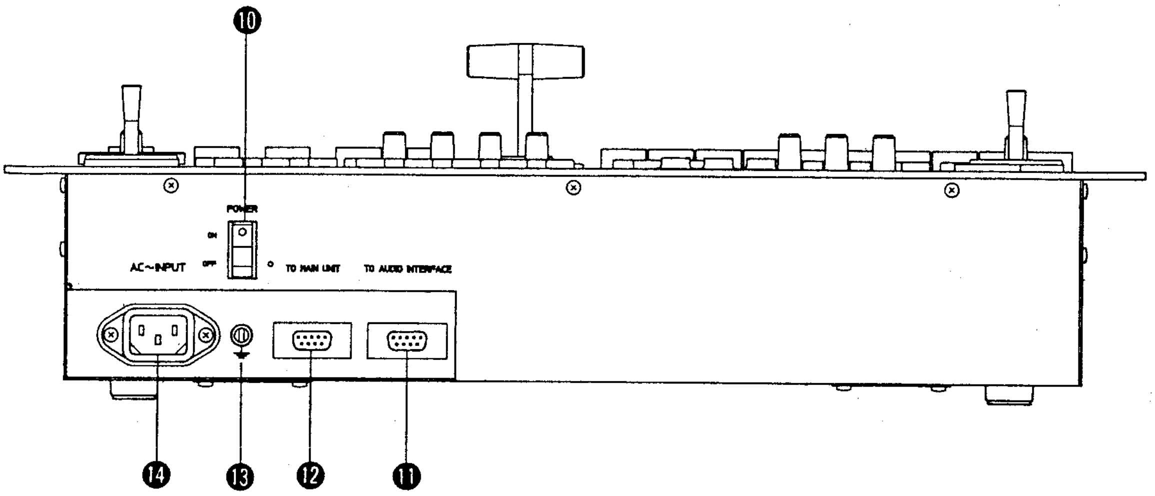
CONTROL UNIT

Control Panel


❶
❷
❸
❹
❺
❻
❼
❽
❾
JVC
KM-3000 COMPONENT SPECIAL EFFECTS GENERATOR
COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
DURAT
WIPE PATTERN
EXT
POSITIONER
CENTER
ON
NOR
N-R
REV
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
DURATION
EFF
DSK
FADE
EFFECTS KEYER
EFF MATTE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
COLOR BAR
KEY BUS
BLACK
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
CUT
AUTO
D S K
DSK MATTE
DSK MASK
DSK PVW
DSK ON
FADE TO BLACK
L
H

- **Fader lever torque adjusting screw**
  The torque adjustment of the fader lever can be done by turning this screw.
  - Turn it clockwise (↻) to increase the torque.
  - Turn it counterclockwise (↺) to decrease the torque.

Rear Panel


❿
⓫
⓬
⓭
⓮
POWER
ON
OFF
AC~INPUT
TO MAIN UNIT
TO AUDIO INTERFACE

❶ Cross Point select buttons

For selecting video sources to be used on three buses.

- KEY BUS select buttons
  For selecting a video source to be used as part of key effects.
- PROGRAM BACKGROUND BUS select buttons
  For selecting a video source to be output to the on-air line.
- PRESET BACKGROUND BUS select buttons
  For selecting a video source standing by to be output to the on-air line next after being processed by operating the EFFECTS controls ❾.

❷ EFFECTS KEYER controls

For setting a desired effects key mode.

- **Key Fill video select buttons**
  EFF MATTE : When this button is illuminated, the key fill video is the color matte produced by the COLOR MATTE controls ❸. When this button is not illuminated, the video selected with the KEY BUS select buttons ❶ is the key fill video.
- **Adjustment controls**
  HUE : Adjusts the hue of a chroma key.
  SLICE : Adjusts the slice level of a key source.
  GAIN : Adjusts the gain of a key source.
- **SOURCE select buttons**
  Selects a key source; one at a time.
  KEY BUS : To use the luminance component of a video selected with the KEY BUS select buttons ❶ as a key source.
  CHROM 6 : To use a specified color component of a signal applied to the rear panel INPUT 6 terminal as a key source.
  KEY 7, 8 : To use a signal applied to the rear panel KEY 7 or 8 connector as a key source. To select this, press the 7 or 8 button of the KEY BUS.
  PST PTN (Preset Pattern) : To use a preset pattern selected with the WIPE PATTERN controls ❹ as a key source.
  EXT KEY : To use a black-and-white video signal applied to the rear panel EXT KEY connector as a key source.
- Effects select buttons
  To select special key effects. A combination of effects can also be selected.
  KEY MASK : To mask the unnecessary part of a key signal using a pattern preset with the WIPE PATTERN control ❹.
  INV : To invert the key source.
  SPOT : To obtain a spotlight effect.
  COLOR KILL : To make the key fill video monochrome.

❸ COLOR MATTE/MEMORY/DATA ENTRY controls

- Color Matte adjustment controls
  HUE/SAT stick : Adjusts the color of a color matte to be produced.
  LUM control : Adjusts the brightness of a color matte to be produced.
- Color Matte select buttons
  For selecting the signal to which the color matte is applied.
  BACK COLOR : To apply color matte to the BACK COLOR signal when selected in section ❶.
  BDR EFF : To apply color matte to the border of a wipe and the EFF MATTE signal of EFFECTS KEYER controls ❷.
  DISK COLOR To apply color matte to the DSK MATTE of a downstream key.
- Memory Control buttons
  Control buttons for the color and event memories.
  READ : To read out the data held in the color or event memories.
  STORE : To store the color matte data or control panel settings in memory.
  INC : To call a memory one number higher than that currently displayed.
  DEC : To call a memory one number lower than that currently displayed.
- Date entry buttons (10-digit keypad)
  0 – 9 : To enter data.
  * : Use in combination with buttons 0 — 4 for special functions.
- Entry item buttons
  For selecting the item to which the entered data is allocated.
  HUE : Color matte hue data.
  SAT : Color matte saturation data.
  LUM : Color matte brightness data.
  COLOR : Color memory number.
  EVENT : Event memory number.
  DURAT : Data for the DURATION controls ❻.
- EDITOR ENABLE indicator
  When this indicator is lit, it shows that the KM-3000 can be controlled from an editing controller. (Local control is also possible with the KM-3000's control unit.)

❹ WIPE PATTERN select buttons and controls

- Pattern select buttons
  One wipe pattern at a time can be selected from the 24 different patterns; 23 generated by the KM-3000 and one from an external generator connected to the rear panel.
- Wipe mode select buttons
  NOR : The wipe pattern moves in the normal direction (direction in which the white area increases).
  N-R : The direction of the wipe pattern movement alternates for each wipe.
  REV : The wipe pattern moves in the reverse direction (direction in which the black area increases).
  ASPECT (ON) : With this button set to ON, the aspect ratio of the wipe patterns can be varied.
- Adjustment controls
  MASK/PST SIZE: To set the pattern size in the KEY MASK mode (EFFECTS KEYER or DSK section) and the PST PTN mode (EFFECTS KEYER section).
  PTN EDGE SOFT: To adjust the sharpness of the border of a wipe pattern.
  PTN EDGE BORDER: To adjust the width of the border of a wipe pattern.
  ASPECT : To adjust the aspect ratio of a wipe pattern with the ASPECT button set to ON.

⑤ POSITIONER controls

For shifting the position of a wipe pattern with the stick.

- ON : To switch on or off the POSITIONER controls.
- CENTER button: To return the wipe pattern to the center instantly.
- Stick : To shift the position of the wipe pattern when the ON button is illuminated.

⑥ DURATION set controls

For setting the duration of an effect in the AUTO (EFFECTS section), AUTO (DSK section) and FADE TO BLACK modes.

- Rotary dial : To set the required duration of an effect; the set time is displayed in the window by the dial.
- Effect select buttons

  For selecting the effect for which the duration is to be set.

  EFF : The duration of feed executed with the AUTO button in the EFFECTS section ⑨.

  DSK : The duration of automatic feed executed with the AUTO button in the DSK section ⑦.

  FADE : The duration of fade-in or out executed with the FADE TO BLACK button ⑧.

⑦ DSK (Downstream Keyer) controls

For setting the DSK mode and outputting from the PROGRAM output connector.

- Key Fill video select button

  DSK MATTE : When this button is illuminated, a color matte produced with the COLOR MATTE controls ③ is the key fill video. With this button not illuminated, the signal selected as a key source is the key fill video as it is.
- Adjustment controls

  SLICE : Adjusts the slice level of a key source.

  GAIN : Adjusts the gain of a key source.
- SOURCE select buttons

  For selecting a DSK source; one at a time.

  KEY BUS : To use the luminance component of a signal selected with the KEY BUS select buttons as a key source.

  7 : To use the signal applied to the rear panel KEY 7 connector as a key source by pressing the 7 button of the KEY BUS. Internal switching makes it possible to use the Y signal from INPUT 7.

  8 : To use the signal applied to the rear panel KEY 8 connector as a key source by pressing the 8 button of the KEY BUS. Internal switching makes it possible to use the Y signal from INPUT 8.

> For internal switching, consult a JVC-authorized service agent.

- Effect select buttons

  KEY MASK : To mask the unnecessary part of a source using a wipe pattern preset with the WIPE PATTERN controls ④.

  INV : To invert the key source.
- DSK execute buttons

  CUT : To cut a DSK effect into and out of the program output signal (on-air output) instantly.

  AUTO : To execute a DSK effect into and out of the program output signal with the timing preset by the DURATION controls ⑥.

⑧ FADE TO BLACK button

To fade OUT/IN the program output signal with the timing preset by the DURATION controls ⑥.

⑨ EFFECTS controls

To output the video selected with a PROGRAM BACKGROUND BUS or PRESET BACKGROUND BUS select buttons and/or switching on and off the key effect preset with the EFFECTS KEYER controls ② in either the MIX or WIPE mode.

- NEXT EFFECTS buttons

  To select an effect to be applied to the next program output signal.

  BKGD : Press this button for the effect to be executed between the PROGRAM BACKGROUND BUS and PRESET BACKGROUND BUS video signals.

  KEY : Press this button for the effect to be executed to keying on/off for the PROGRAM BACKGROUND BUS video signal.
- EFFECTS MODE buttons

  To select the feed mode.

  MIX : To feed signals in the MIX mode.

  WIPE : To feed signals in the WIPE mode.
- Execute controls

  To execute feed of the PROGRAM/PRESET BACKGROUND BUS signals and/or keying on/off.

  CUT : To execute instantly.

  AUTO : To execute with the timing preset by the DURATION controls ⑥.

  FADER lever : To execute manually. The direction of execution is indicated by the LEDs to the left of the lever.

⑩ POWER switch

To turn on/off the power of the control unit. The main unit should be switched on/off with its POWER switch.

⑪ TO AUDIO INTERFACE connector

For the connection of the MI-F30 Auto Fader Unit (an option that works with the optionally available MI-3000 Audio Mixer). With this set-up, the TRANS RATE and the BUS selection of the MI-3000 can be controlled from the KM-3000.

⑫ TO MAIN UNIT connector

For the connection of the main unit using the provided cable.

⑬ Ground terminal

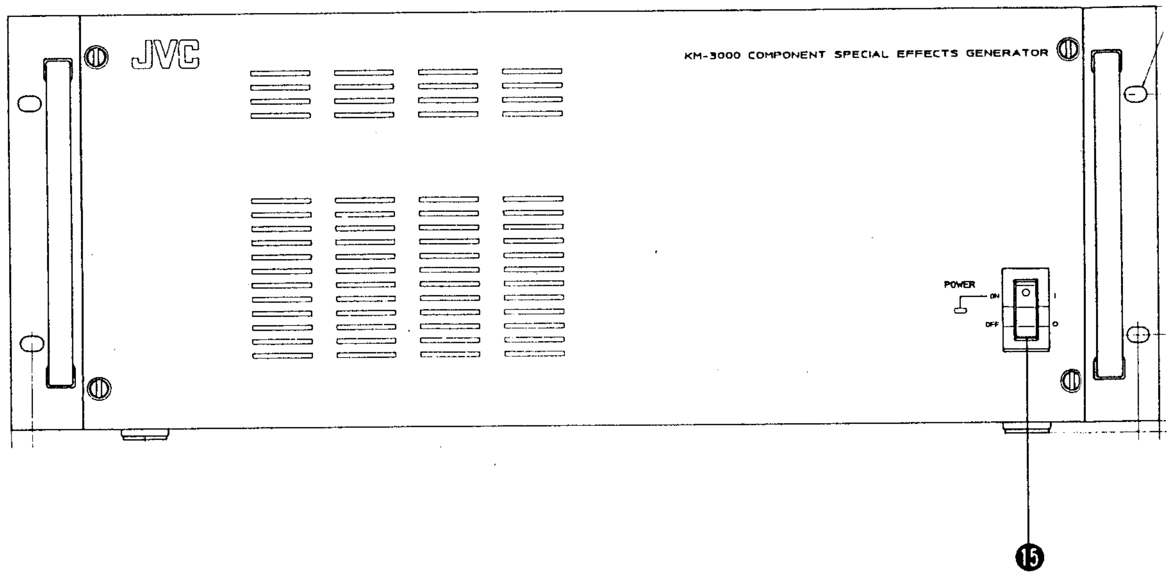
For grounding the entire system. To prevent malfunctions due to noise, ground the connected equipment and racks to the chassis.

⑭ AC INPUT socket

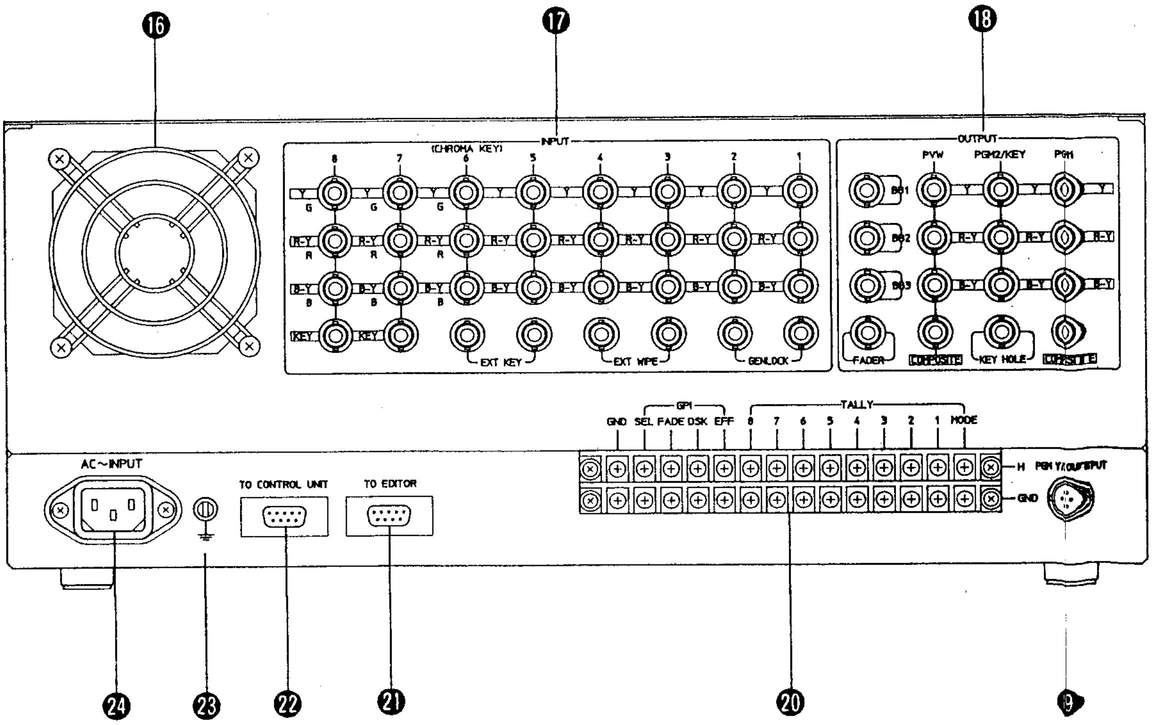
Connect to an AC outlet with the power cord provided.

MAIN UNIT

Front Panel


JVC
KM-3000 COMPONENT SPECIAL EFFECTS GENERATOR
POWER
ON
OFF
I
O
⑮

Rear Panel


⑯
⑰
⑱
INPUT
(CHROMA KEY)
8
7
6
5
4
3
2
1
Y
G
R-Y
R
B-Y
B
KEY
EXT KEY
EXT WIPE
GENLOCK
OUTPUT
PVW
PGM2/KEY
PGM
BG1
BG2
BG3
FADER
COMPOSITE
KEY HOLE
COMPOSITE
GPI
TALLY
GND
SEL
FADE
DSK
EFF
MODE
H
GND
PGM Y/C OUTPUT
AC~INPUT
TO CONTROL UNIT
TO EDITOR
㉔
㉓
㉒
㉑
⑳
⑲

⑮ POWER switch

To turn on/off the power of the main unit. The control unit should be switched on/off with its own POWER switch.

⑯ Ventilator

There is a cooling fan inside. Always allow sufficient space behind this.

⑰ INPUT connectors

For connecting source signals.

- Y/R-Y/B-Y 1 – 6, Y/R-Y/B-Y/KEY 7, 8 connectors
  Input connectors for Y/R-Y/B-Y component signals. Numbers 1 – 8 correspond to those of the cross point select BUS buttons ❶.
  The KEY inputs (7 and 8) can be used as a key source input to be processed by the EFFECTS KEYER or DSK controls. Connect a DVE or the key source output (key hole output) of a character generator to these terminals.

> - The signal applied to Y/R-Y/B-Y 6 can be used as a chroma key source to be processed by the EFFECTS KEYER controls.
> - R/G/B signals can be applied to Y/R-Y/B-Y 6 – 8 when the unit is modified by internal switching. For modification consult a JVC-authorized service agent. You will be charged for modification.

- GENLOCK connectors
  Apply a reference sync signal (composite video or black burst) to either connector. One of the two can be used as a loop-through output. When not used as a loop-through output, terminate it with the provided 75-ohm termination plug.
- EXT WIPE connectors
  Apply a wipe waveform from an external generator. One of the two can be used as a loop-through output. When not used as a loop-through output, terminate it with the provided 75-ohm termination plug.
- EXT KEY connector
  Apply a black-and-white video signal. The input signal serves as a key source when the EXT KEY mode is selected in the EFFECTS KEYER section ❷.

> **Note:**
> **Keying of a color video signal is not possible.**

⑱ OUTPUT connectors

For outputting different signals.

- PGM 1 Y/R-Y/B-Y, COMPOSITE connectors
  Output terminals for the program signal (on-air signal). Component and composite signals are output simultaneously.
- PGM 2 KEY, Y/R-Y/B-Y connectors
  Output connectors for the program signal (on-air signal). Can be modified by internal switching so that the signal selected with the KEY BUS select buttons can be output. For modification, consult a JVC authorized service agent. You will be charged for modification.
- KEY HOLE connectors
  Outputs a key hole signal selected in the EFFECTS KEYER section ❷.
- PVW Y/R-Y/B-Y, COMPOSITE connectors
  Preview connectors. Component and composite signals are output simultaneously.
- BB1/BB2/BB3 connectors
  These output a reference sync signal (black burst) generated by the built-in SSG. If the entire system is to be genlocked to the KM-3000, connect these connectors to the sync inputs of connected pieces of equipment.
- FADER connector
  Outputs DC voltages (0 – 5 V) corresponding to the position of the FADER lever in the EFFECTS section ❾. To control an external piece of equipment from the FADER lever, use this terminal.

⑲ Separate Y/C OUTPUT connector

Outputs the on-air signal in the form of Y/C separate signals conforming to the S-VHS format. Connect to the 7-pin Y/C input terminal of a S-VHS recorder.

> The NTSC version can be modified by internal switching so that it can be connected to the DUB input terminal of a 3/4" U-VCR. For modification consult a JVC-authorized service agent. You will be charged for modification.

⑳ Tally output and GPI input terminals

- TALLY 1 – 8/MODE terminals
  Tally output terminals. Normally they function in the make-contact mode. When the MODE terminal is connected to GND, the mode can be changed to the power supply mode (DC 5 V, 10 mA max.)
- GPI (General Purpose Interface) terminals
  When a switch is connected between these terminals and the GND, the EFFECTS, DSK and FADE TO BLACK effect can be switched on and off externally.

㉑ TO EDITOR connector

Connect to an external editor. Serial communication conforming to RS-422 is possible via the 9-pin D-SUB connector.

> Serial communication conforming to RS-232C is also possible. For more details consult a JVC-authorized service agent.

㉒ TO CONTROL UNIT connector

Connect to the control unit with the provided cable.

㉓ GND terminal

For grounding the entire system. To prevent malfunctions due to noise, ground the connected equipment and racks to the chassis.

㉔ AC INPUT socket

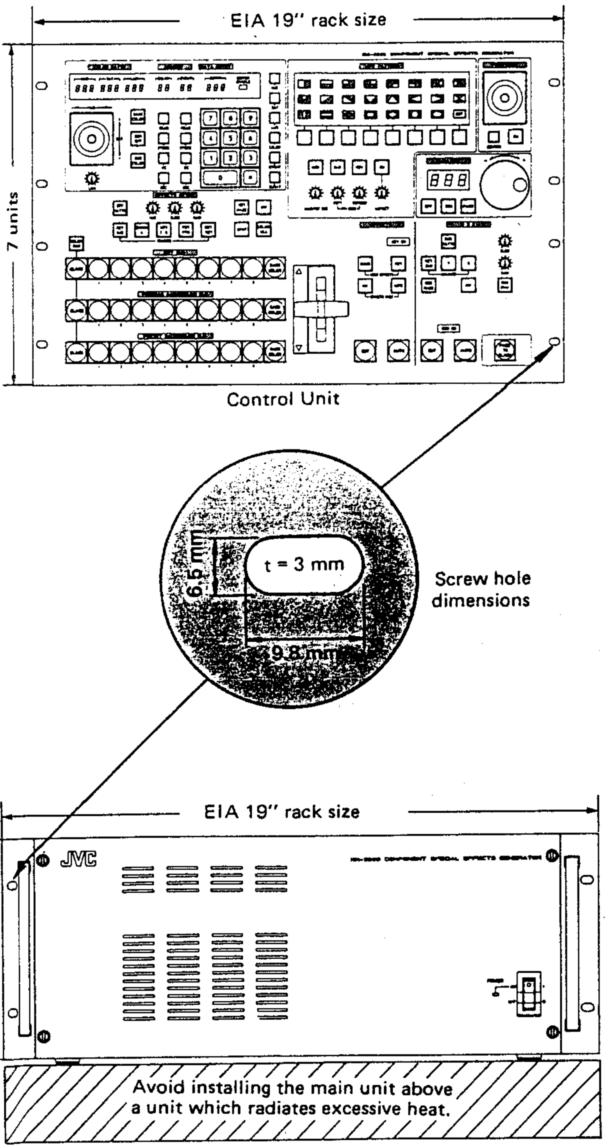
Connect to an AC outlet with the provided power cord.

INSTALLATION

Screws are not provided. Obtain appropriate screws.

Installation of the Control Unit (into a control console, for example)
Refer to the figures below.

Notes:
- Standard operating position of the control unit is horizontal. Do not install it at an angle greater than 45°, otherwise the position of the FADER lever cannot be identified.
- Do not attempt to lift the control unit by the FADER lever.


EIA 19" rack size
7 units
t = 3 mm
6.5 mm
9.8 mm
Screw hole dimensions
EIA 19" rack size
JVC
4 units

Control Unit

Avoid installing the main unit above a unit which radiates excessive heat.

Main Unit

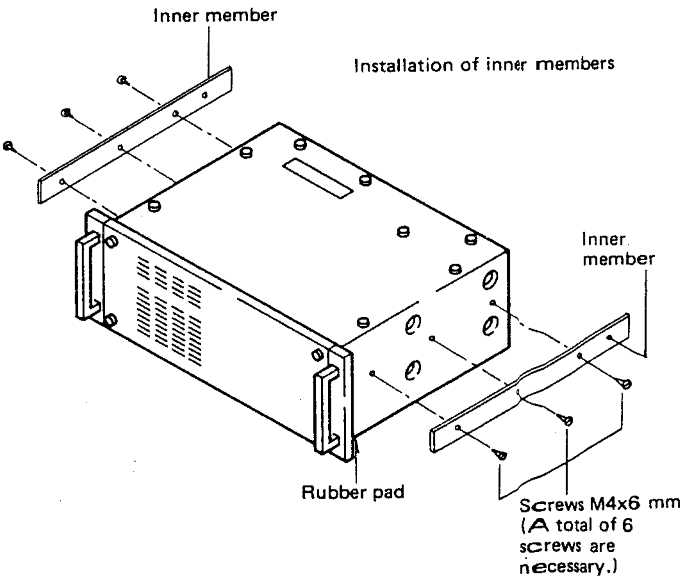
Installation of the Main Unit (into a rack, for example)
The main unit can be installed in an EIA 19" rack using threaded holes on its sides.

1. Remove the four screws retaining the rubber pads.
2. Attach the inner members (optional) of the slide rails on both sides of the main unit.
3. Attach the outer members (optional) of the slide rails to the rack. Then install the main unit into the rack.

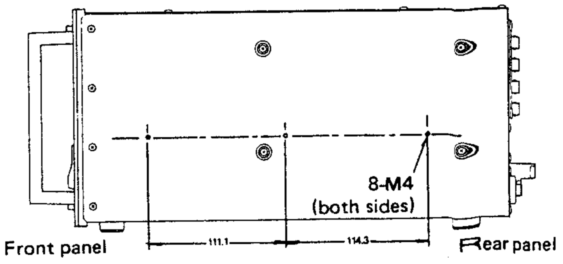
Applicable slide rail model

Model	Manufacturer	Slide length
C-305-20	Accuride Co., Ltd.	508 mm (20")

Note:
- For installation of the outer members into a rack, consult the dealer from whom you buy the slide rails or rack.


Inner member
Inner member
Rubber pad
Screws M4x6 mm (A total of 6 screws are necessary.)

Installation of inner members


8-M4 (both sides)
Front panel
111.1
114.3
Rear panel

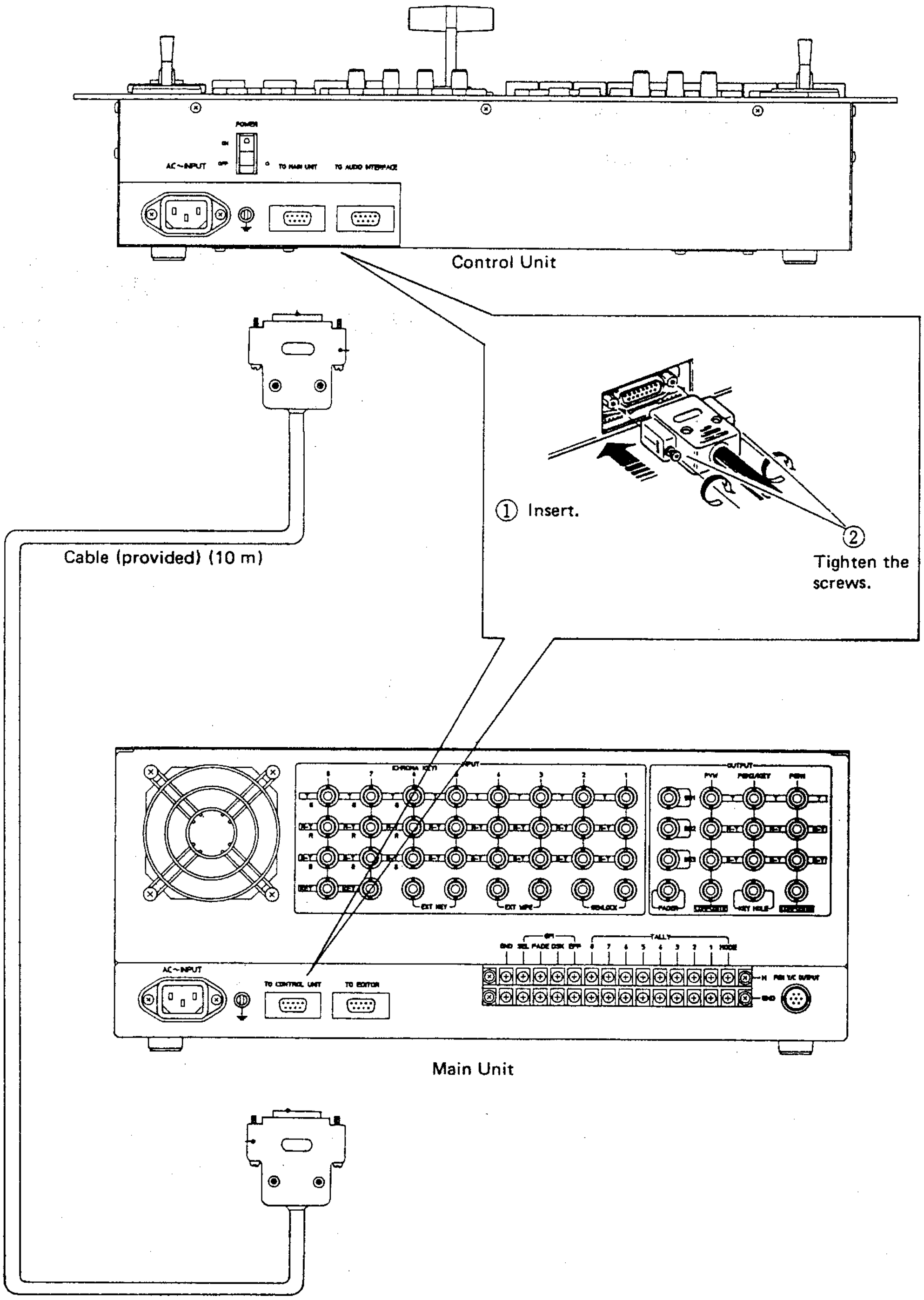
Inner member mounting hole positions KM3000

Unit: mm

CONNECTIONS

Connection of the control unit to the main unit

Connect as illustrated by using the provided cable.

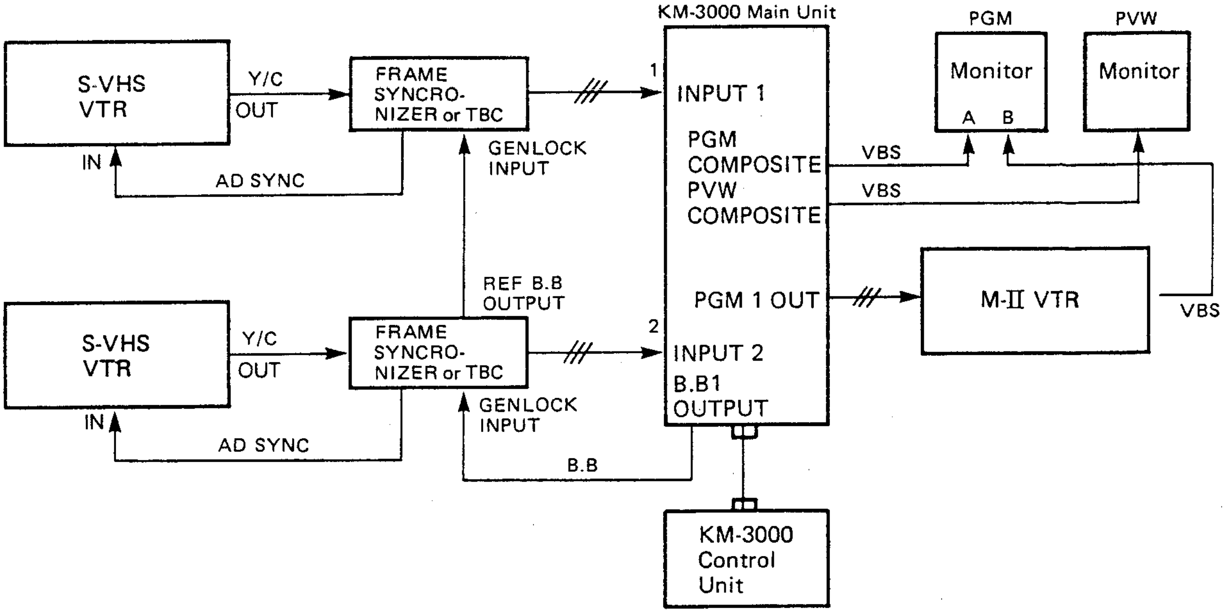

POWER
AC~INPUT
TO MAIN UNIT
TO AUDIO INTERFACE
Control Unit
① Insert.
② Tighten the screws.
Cable (provided) (10 m)
AC~INPUT
TO CONTROL UNIT
TO EDITOR
Main Unit

Can be extended up to 100 m (328 ft.). Further extension may cause malfunctions.

System connection example (1)

A/B roll editing system using two S-VHS recorders.

The arrow —///→ shows the component (Y/R-Y/B-Y) signal lines.

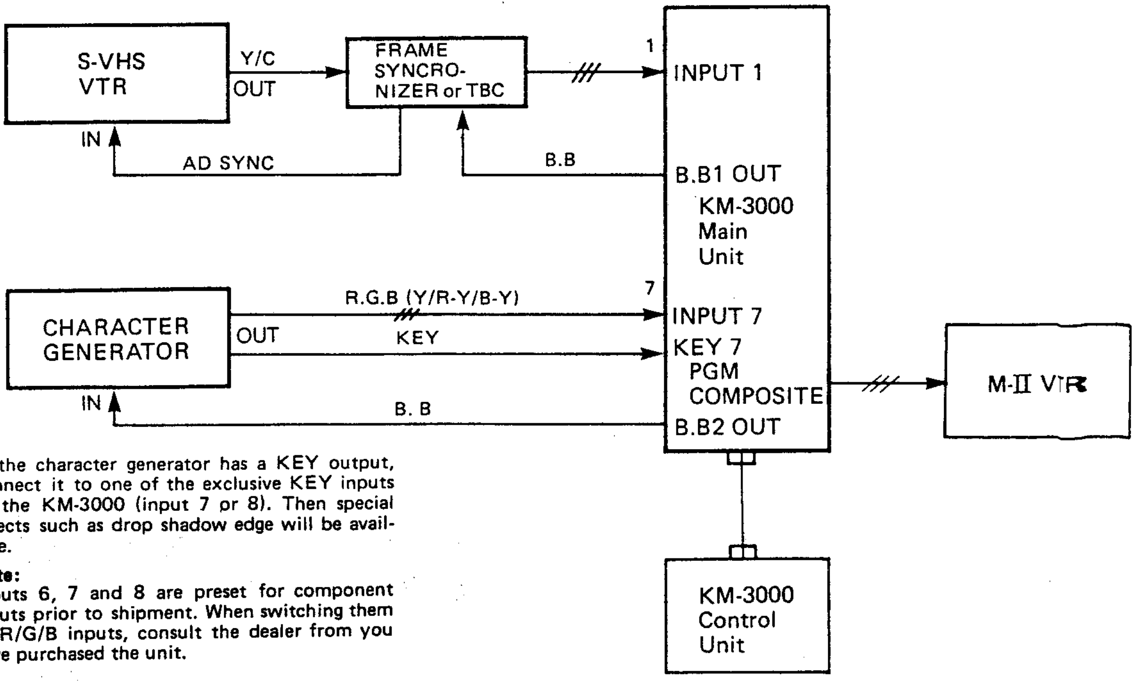

KM-3000 Main Unit
PGM
PVW
S-VHS VTR
Y/C
OUT
IN
AD SYNC
FRAME SYNCRO-NIZER or TBC
GENLOCK INPUT
1
INPUT 1
Monitor
A B
Monitor
PGM COMPOSITE
PVW COMPOSITE
VBS
VBS
REF B.B OUTPUT
PGM 1 OUT
M-II VTR
VBS
S-VHS VTR
Y/C
OUT
IN
AD SYNC
FRAME SYNCRO-NIZER or TBC
GENLOCK INPUT
2
INPUT 2
B.B1 OUTPUT
B.B
KM-3000 Control Unit

System connection example (2)

Superimposing system using a character generator.

The arrow —///→ shows the component (Y/R-Y/B-Y) signal lines.

Connection of a character generator

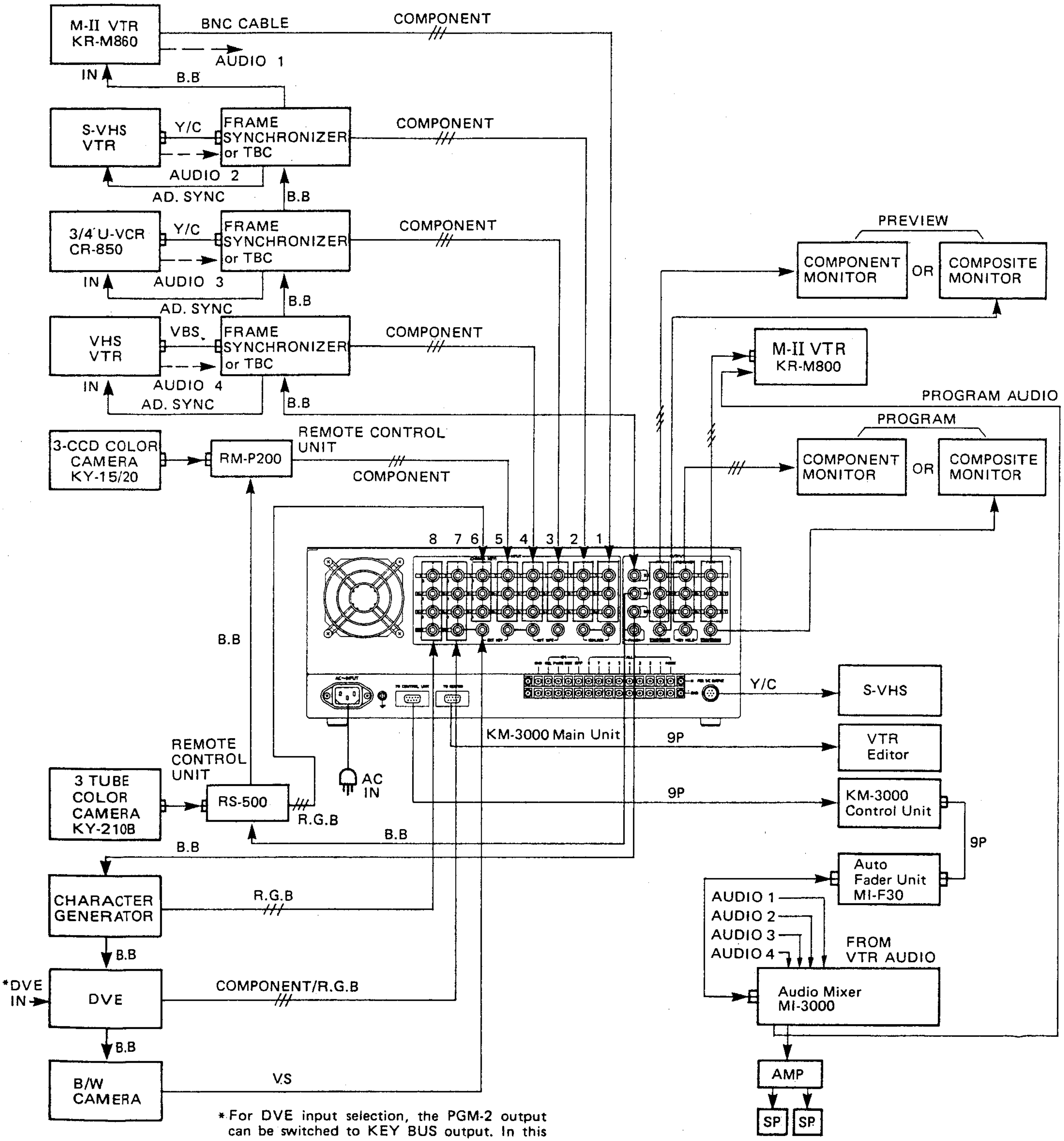

S-VHS VTR
Y/C
OUT
IN
AD SYNC
FRAME SYNCRO-NIZER or TBC
B.B
1
INPUT 1
B.B1 OUT
KM-3000 Main Unit
CHARACTER GENERATOR
OUT
IN
R.G.B (Y/R-Y/B-Y)
KEY
B. B
7
INPUT 7
KEY 7
PGM COMPOSITE
B.B2 OUT
M-II VTR
KM-3000 Control Unit

If the character generator has a KEY output, connect it to one of the exclusive KEY inputs of the KM-3000 (input 7 or 8). Then special effects such as drop shadow edge will be available.

Note:
Inputs 6, 7 and 8 are preset for component inputs prior to shipment. When switching them to R/G/B inputs, consult the dealer from you have purchased the unit.

System connection example (3)

Comprehensive post-production system


M-II VTR KR-M860
BNC CABLE
COMPONENT
AUDIO 1
IN
B.B
S-VHS VTR
Y/C
FRAME SYNCHRONIZER or TBC
COMPONENT
AUDIO 2
AD. SYNC
B.B
3/4″U-VCR CR-850
Y/C
FRAME SYNCHRONIZER or TBC
COMPONENT
IN
AUDIO 3
AD. SYNC
B.B
VHS VTR
VBS
FRAME SYNCHRONIZER or TBC
COMPONENT
IN
AUDIO 4
AD. SYNC
B.B
3-CCD COLOR CAMERA KY-15/20
RM-P200
REMOTE CONTROL UNIT
COMPONENT
B.B
8 7 6 5 4 3 2 1
KM-3000 Main Unit
AC IN
REMOTE CONTROL UNIT
3 TUBE COLOR CAMERA KY-210B
RS-500
R.G.B
B.B
B.B
CHARACTER GENERATOR
R.G.B
B.B
*DVE IN
DVE
COMPONENT/R.G.B
B.B
B/W CAMERA
V.S
PREVIEW
COMPONENT MONITOR
OR
COMPOSITE MONITOR
M-II VTR KR-M800
PROGRAM AUDIO
PROGRAM
COMPONENT MONITOR
OR
COMPOSITE MONITOR
Y/C
S-VHS
9P
VTR Editor
9P
KM-3000 Control Unit
9P
Auto Fader Unit MI-F30
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
FROM VTR AUDIO
Audio Mixer MI-3000
AMP
SP
SP

*For DVE input selection, the PGM-2 output can be switched to KEY BUS output. In this case, EFFECTS KEYER selection is not possible. For switching, consult authorized-JVC service agent.

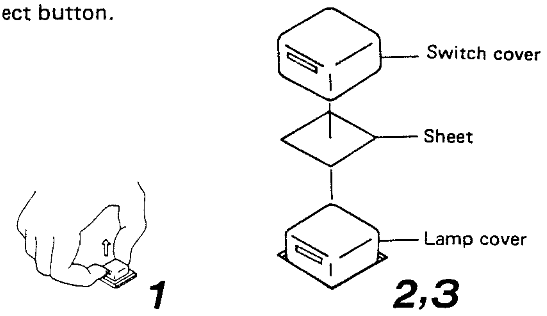
Notes:

- For connections and operations of video cameras, remote control units and video recorders, refer to the relevant instruction manuals.
- Video tape playback signals contain considerable jitters and dropouts. When applying special effects to these signals, use a TBC (Time Base Corrector).

PREPARATIONS

Identifying inputs

For easy identification of video sources connected to the rear panel INPUT connectors, ID labels are provided. Write the name of a source on each label and apply it to each cross point select button.



1. Remove the switch cover.
2. Put the label on the lamp cover.
3. Replace the switch cover.

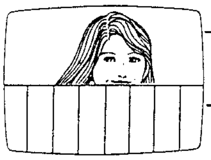
Note:
It might happen that the lamp cap comes out when the switch cover is removed. If this happens, hold the lower part of the lamp cap in place with a pair of needle-nose pliers to separate it from the switch cover.

System adjustments

A system consisting of newly connected components may not function satisfactorily because their signal level and phase may differ from each other. Perform system adjustments as described.

(For more accurate adjustments, a vectorscope, a waveform monitor, etc. are necessary. Consult a JVC-authorized Service agent. You will be charged for adjustment.)

1 Turn on the power of all connected pieces of equipment.
2 Position the FADER lever at the bottom.
3 Turn on the power of the KM-3000 control unit and main unit in this order. The BLACK and COLOR BARS buttons of all buses will be illuminated, and in the EFFECTS section, BKGD and MIX will be automatically set.
4 Make sure that the color bars pattern appears on the program monitor.
5 Press the appropriate WIPE PATTERN button a few times to select ▨ .
6 Press the WIPE button in the EFFECTS section. (The button will be illuminated.)
7 Press the PRESET BACKGROUND BUS 1 button.
8 Set the FADER lever to the center position.
- The monitor will show the picture below.



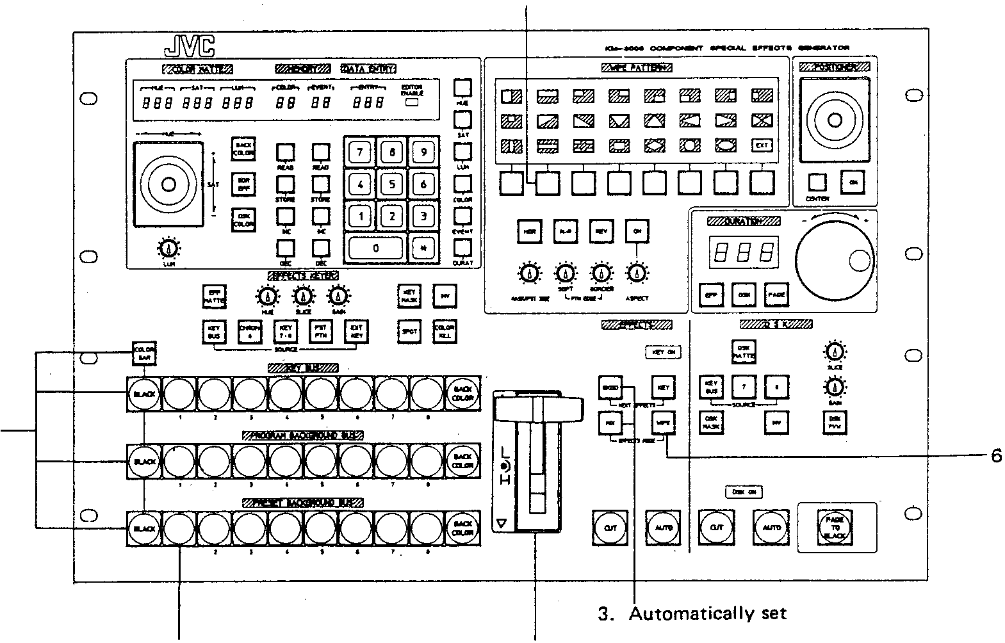
Picture selected with PRESET BACKGROUND BUS (from INPUT 1)

Picture selected with PROGRAM BACKGROUND BUS (color bars pattern)

9 Adjust the horizontal phase of input 1.
- Adjust the horizontal phase control (H. PHASE) of the equipment connected to the INPUT 1 terminals so that the left edge of the PRESET BACKGROUND BUS picture coincides with the left edge of the PROGRAM BACKGROUND BUS picture.

10 Perform horizontal phase adjustments for other inputs (2 – 8) in the same way.
11 If color video cameras are included in the system, shoot the same subject (gray scale, for example) with them and fine-adjust the black level (pedestal), white level (video level) and chroma.

Notes:
- For adjustment, use an underscanning monitor. Adjustments are not possible with an ordinary TV monitor.
- For operation of the cameras or remote control units, refer to the relevant instruction manuals.



5. Select the ▨ pattern.

3. Automatically set. (Buttons are illuminated.)

6. Press (Illuminated)

3. Automatically set

7. Press (Illuminated)

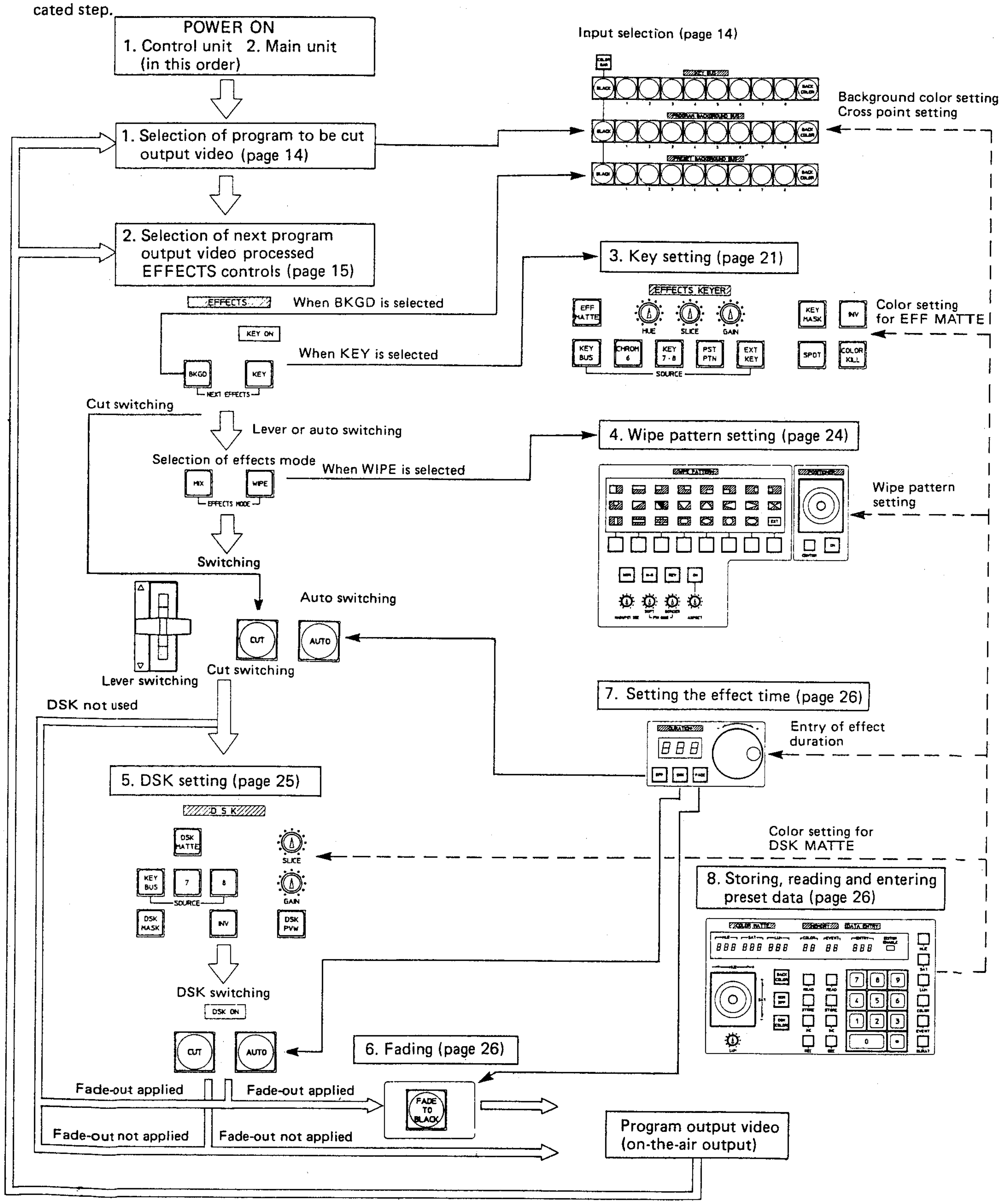
2. Set to the bottom.

OPERATIONS

Operation flow chart

- Before operation, be sure to perform system adjustments.
- Follow the steps as indicated by ⇨.
  Operations indicated by ——► are associated with the indicated step.

For more details of each step, refer to indicated pages.
1. – 5.: Basic operations
6. – 8.: Applied techniques


POWER ON
1. Control unit 2. Main unit
(in this order)
1. Selection of program to be cut output video (page 14)
2. Selection of next program output video processed EFFECTS controls (page 15)
EFFECTS
When BKGD is selected
KEY ON
When KEY is selected
BKGD
KEY
NEXT EFFECTS
Cut switching
Lever or auto switching
Selection of effects mode
When WIPE is selected
MIX
WIPE
EFFECTS MODE
Switching
Auto switching
CUT
AUTO
Lever switching
Cut switching
DSK not used
5. DSK setting (page 25)
D S K
DSK MATTE
SLICE
KEY BUS
7
8
SOURCE
GAIN
DSK MASK
INV
DSK PVW
DSK switching
DSK ON
CUT
AUTO
Fade-out applied
Fade-out applied
Fade-out not applied
Fade-out not applied
6. Fading (page 26)
FADE TO BLACK
Program output video (on-the-air output)
Input selection (page 14)
BLACK
BACK COLOR
Background color setting
Cross point setting
3. Key setting (page 21)
EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY MASK
INV
Color setting for EFF MATTE
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
4. Wipe pattern setting (page 24)
Wipe pattern setting
7. Setting the effect time (page 26)
DURATION
888
Entry of effect duration
Color setting for DSK MATTE
8. Storing, reading and entering preset data (page 26)
COLOR MATTE
MEMORY
DATA ENTRY
888 888 888
88 88
888
7 8 9
4 5 6
1 2 3
0

Basic Operations

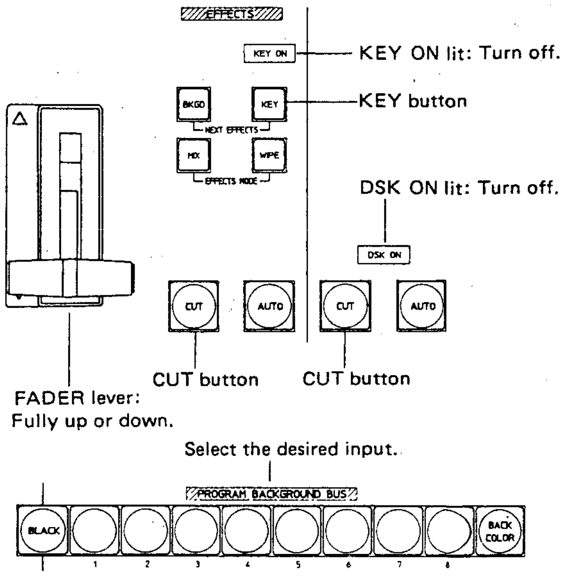
1. Selection of program output video to be cut

- If DSK ON in the DSK section is lit, press the CUT button in the DSK section to turn it off.

1 Push the FADER lever fully upward or downward. If KEY ON in the EFFECTS section is lit, press the KEY button and then the CUT button in the EFFECTS section. The lamp will go off.

2 Press the BKGD button.

3 Press the button on the PROGRAM BACKGROUND BUS corresponding to the desired input; the selected picture will go over the air.


EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
DSK ON
CUT
AUTO
CUT
AUTO
PROGRAM BACKGROUND BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8

KEY ON lit: Turn off.

KEY button

DSK ON lit: Turn off.

CUT button

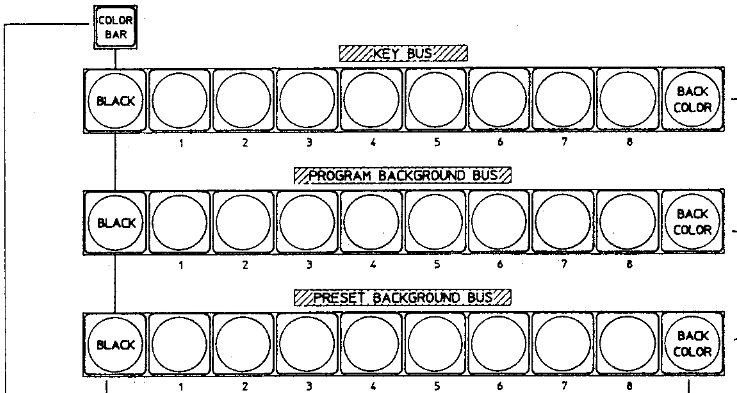
CUT button

FADER lever:
Fully up or down.

Select the desired input.

Input Selection (Cross Point Select section)

Select one input on each BUS by pressing the corresponding buttons. The pressed buttons will be illuminated. The illumination is bright when the selected input is being output from PGM OUTPUT (on-air line), and is dim when the selected input is standing by.


COLOR BAR
KEY BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8
PROGRAM BACKGROUND BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8
PRESET BACKGROUND BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8

KEY BUS select buttons
For selecting an picture which is used with the effects•keyer (EFFECTS KEYER section) and the downstream keyer (DSK section).

PROGRAM BACKGROUND BUS select buttons
For selecting an picture which is being output from PGM OUTPUT (on-air line).

PRESET BACKGROUND BUS select buttons
For selecting an picture which is to be output next from PGM OUTPUT (on-air line).

BLACK buttons
For outputting the black signal (without setup) or color bars pattern from all buses. Switching between the black and color bars signals is done with the COLOR BARS button.

BACK COLOR buttons
For outputting a color preset by the COLOR MATTE/MEMORY/DATA ENTRY controls from all buses. The same color is output from all buses. For presetting the color, refer to page 26.

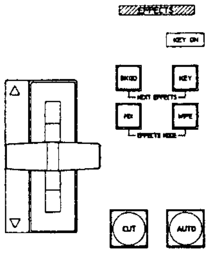
COLOR BARS button
For switching between the black and color bars signals to be output from all buses. The button has a lamp which lights when the color bars signal is selected.

1 — 8 buttons
Numbers correspond to those of the rear panel INPUT 1 — 8 connectors.

2. Selection of next program output video processed by the EFFECTS controls

This chapter describes the method of outputting a standing-by video (selected on the PRESET BACKGROUND BUS) and a key effect preset with the EFFECTS KEYER controls.

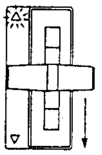
A. Outputting the PRESET BACKGROUND BUS video to the on-air line (Switching from the PROGRAM BACKGROUND BUS video)


EFFECTS
KEY ON
BKGD
KEY
MIX
WIPE
CUT
AUTO

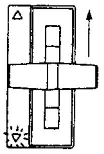
Preparation

1 If the FADER lever is positioned midway, fully push it in the direction opposite to that indicated by one of the LEDs to the left of the lever. There may be cases when both LEDs are lit. In such cases, push the lever fully in either direction.

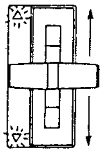
Push downward.



Push upward.



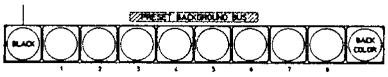
Push in either direction



- If KEY ON is lit, press the KEY button and then the CUT button to turn it off.

2 Press the BKGD button. (The button will be illuminated.)

3 Select a desired picture by pressing the PRESET BACKGROUND BUS select buttons while referring to the preview monitor.


PRESET BACKGROUND BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8

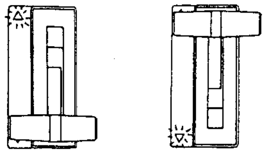
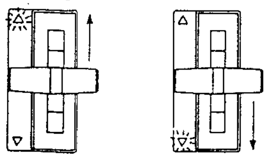
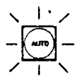
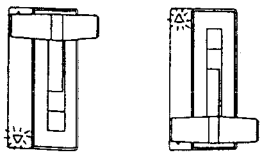
- Three output modes a) – c) are available. These are described for an example in which INPUT 1 is selected on the PROGRAM BACKGROUND BUS and INPUT 8 is selected on the PRESET BACKGROUND BUS.

A-a) To output in the MIX mode

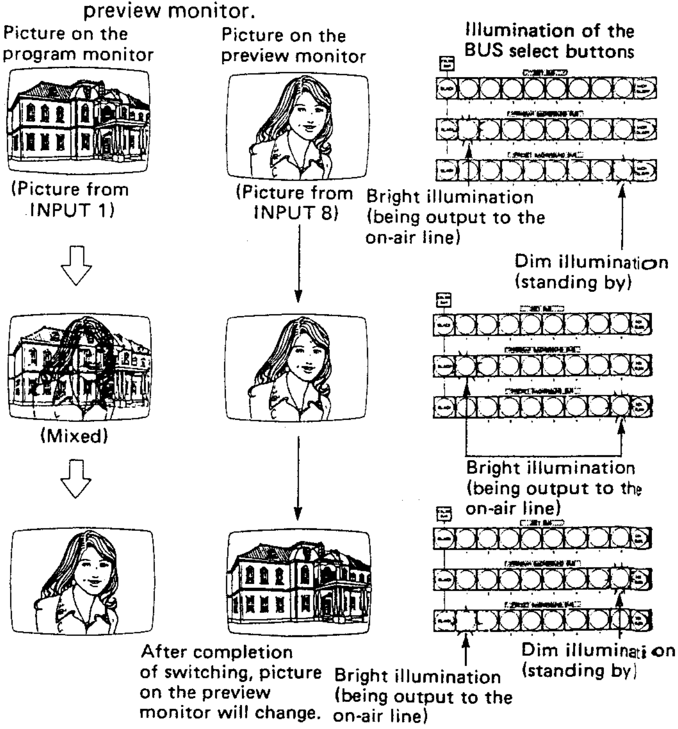
4 Press the MIX button. (The button will be illuminated.)

5 Switching can be done either manually or automatically.

Manual : Performed with the FADER lever.
Automatic : Performed automatically with the preset timing.

Manual operation with the FADER lever	Automatic operation with the AUTO button
Switching start  Move the lever in the direction indicated by the lighting LED.	 Press the AUTO button.
Switching in progress 	 Switching will stop if the button is pressed while it is lit, and resume when the button is pressed once again.
Switching completed  Switching is completed when the lever is pushed all the way. The opposite LED will light.	 The lamp of the button will turn off when switching is completed.

- For setting the timing, refer to page 26 "Setting the effect time".
- When the AUTO button is pressed in the middle of manual switching, automatic switching will start from the position where the FADER lever was stopped. (The lever will no longer move.)
- The picture being switched will not be displayed on the preview monitor.


Picture on the program monitor
Picture on the preview monitor
Illumination of the BUS select buttons
(Picture from INPUT 1)
(Picture from INPUT 8)
Bright illumination (being output to the on-air line)
Dim illumination (standing by)
(Mixed)
Bright illumination (being output to the on-air line)
After completion of switching, picture on the preview monitor will change.
Bright illumination (being output to the on-air line)
Dim illumination (standing by)

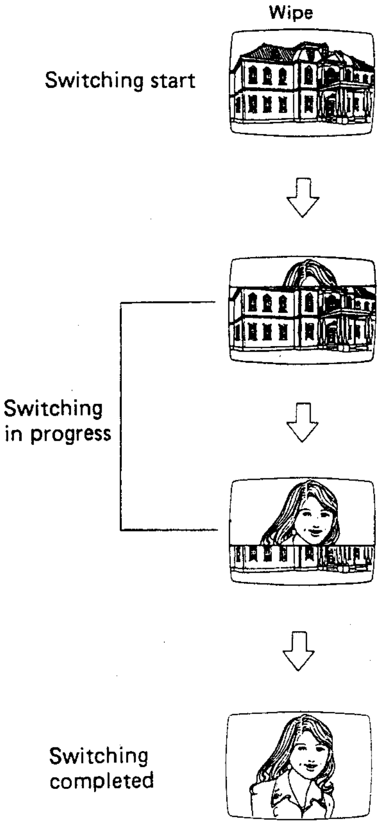
A-b) To output in the WIPE mode

- Steps should follow preparation steps 1 to 3 .

4 Press the WIPE button. (The button will be illuminated.)

- Select a wipe pattern. (See page 24 "Selecting Wipe Patterns".

5 Switching operations are identical with those described in A-a) 5 . The picture on the program monitor changes as follows (assuming the ▨ pattern (NORMAL mode) is selected):

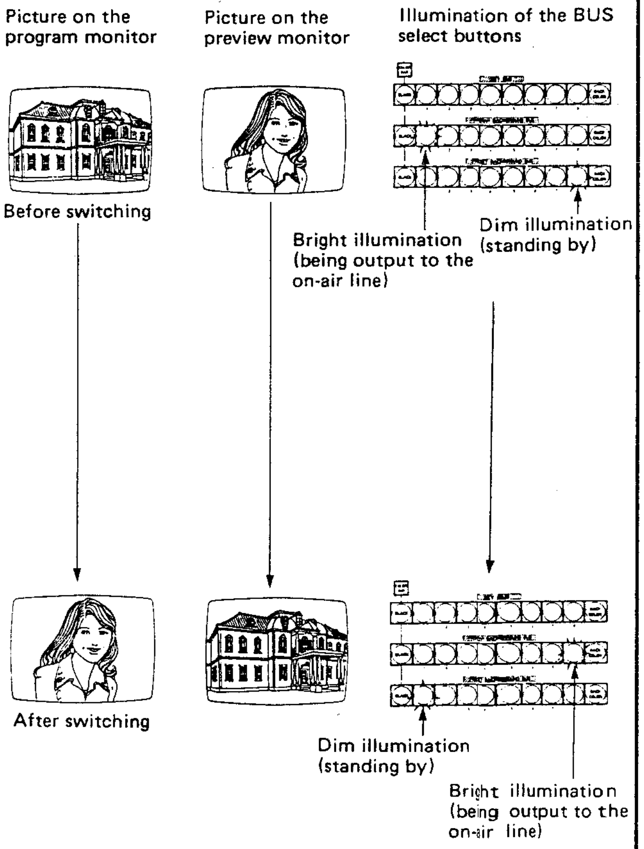

Wipe
Switching start
Switching in progress
Switching completed

A-c) To output in the CUT mode

- Steps should follow preparation steps 1 to 3 .

4 Press the CUT button. The PROGRAM BACKGROUND BUS video will be switched to the PRESET BACKGROUND BUS video instantly.

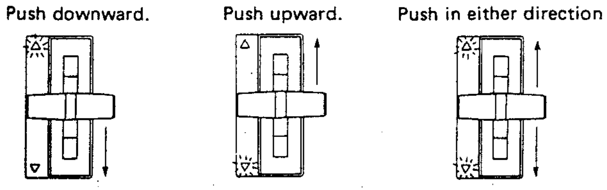
5 The monitor pictures and BUS select button illumination will change as follows:


Picture on the program monitor
Picture on the preview monitor
Illumination of the BUS select buttons
Before switching
Bright illumination (being output to the on-air line)
Dim illumination (standing by)
After switching
Dim illumination (standing by)
Bright illumination (being output to the on-air line)

B. Switching a key in and out

Preparation

1 If the FADER lever is positioned midway, fully push it in the direction opposite to that indicated by one of the LEDs to the left of the lever. There may be cases when both LEDs are lit. In such cases, push the lever fully in either direction.



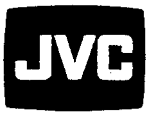
Push downward. Push upward. Push in either direction

- If KEY ON is lit, press the KEY button and then the CUT button to turn it off. Only the PROGRAM BACKGROUND BUS video will be output.

2 Press the KEY button. (The button will be illuminated.)

3 Set a key effect while referring to the preview monitor. (See page 21 "Key Setting".)

- Three output modes a) – c) are available. These are described for an example in which a title as shown right is input to INPUT 7 and switched into and out of the program picture after being processed by the EFFECTS KEYER controls.



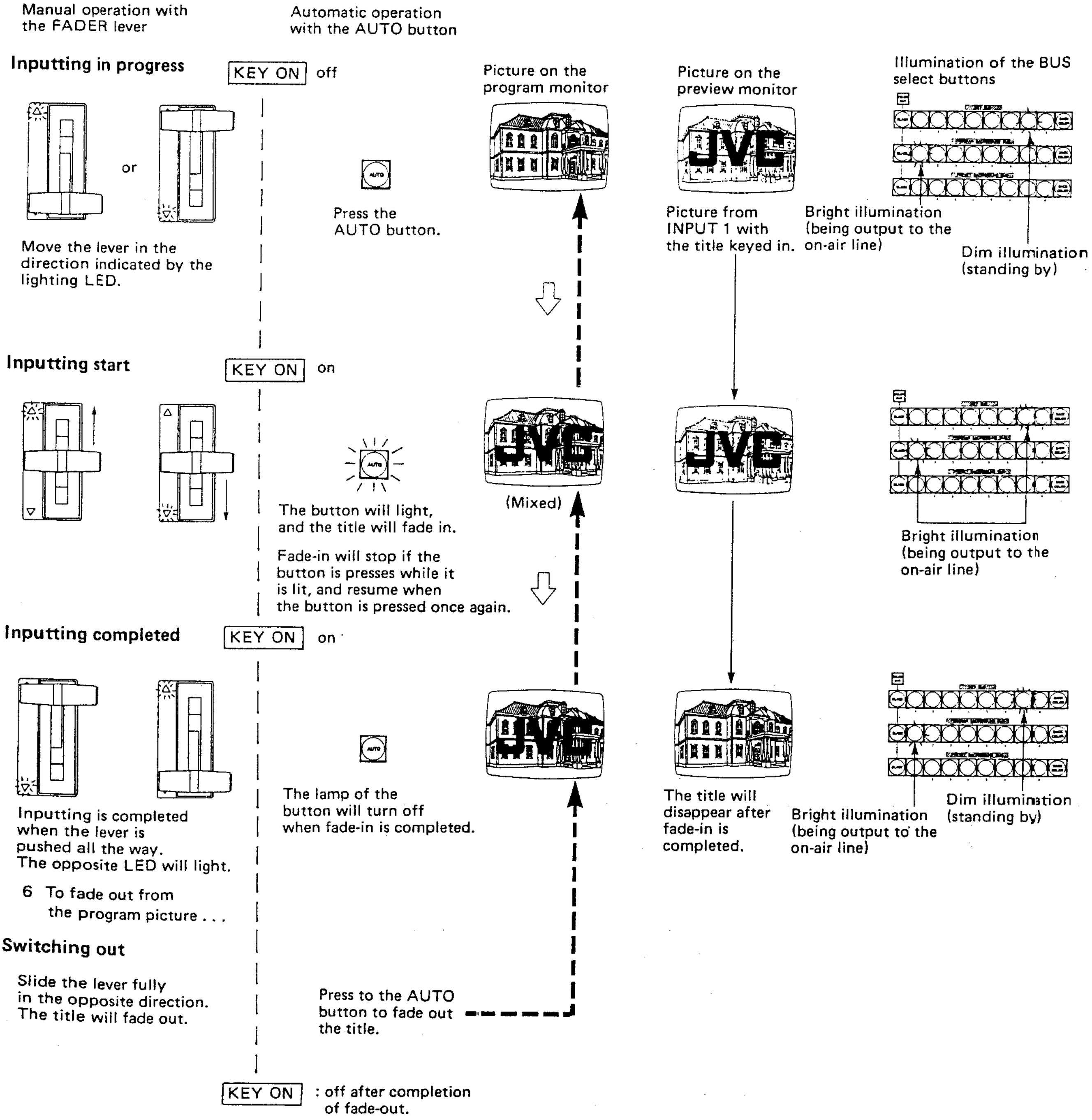
INPUT 7

B-a) To key in the MIX mode

4 Press the [MIX] button. (The button will be illuminated.)

5 Switching can be done either manually or automatically.
Manual : Performed with the FADER lever.
Automatic : Performed automatically with the preset timing.

- For setting the timing, refer to page 00 "Setting the effect time".
- When the AUTO button is pressed in the middle of manual switching, automatic switching will start from the position where the FADER lever was stopped. (The lever will no longer move.)
- The picture being switched will not be displayed on the preview monitor.


Manual operation with the FADER lever
Automatic operation with the AUTO button
KEY ON off
Picture on the program monitor
Picture on the preview monitor
Illumination of the BUS select buttons
or
(Mixed)
KEY ON on
KEY ON on

Inputting in progress

Move the lever in the direction indicated by the lighting LED.

Press the AUTO button.

Picture from INPUT 1 with the title keyed in.

Bright illumination (being output to the on-air line)

Dim illumination (standing by)

Inputting start

The button will light, and the title will fade in.

Fade-in will stop if the button is presses while it is lit, and resume when the button is pressed once again.

Bright illumination (being output to the on-air line)

Inputting completed

Inputting is completed when the lever is pushed all the way.
The opposite LED will light.

The lamp of the button will turn off when fade-in is completed.

The title will disappear after fade-in is completed.

Bright illumination (being output to the on-air line)

Dim illumination (standing by)

6 To fade out from the program picture . . .

Switching out

Slide the lever fully in the opposite direction.
The title will fade out.

Press to the AUTO button to fade out the title.

KEY ON : off after completion of fade-out.

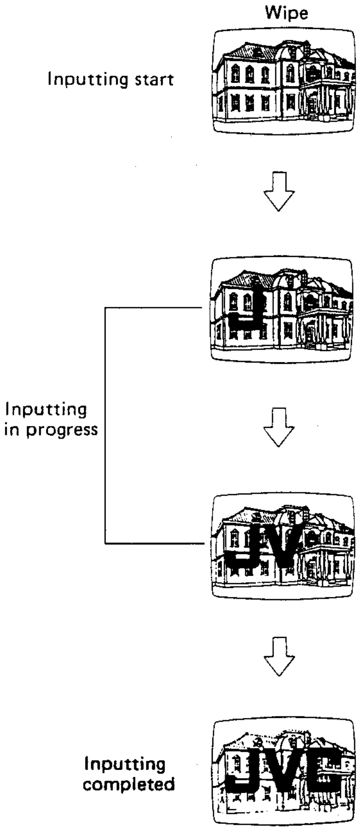
B-b) To key in the WIPE mode

- Steps should follow preparation steps 1 to 3 .

4 Press the WIPE button. (The button will be illuminated.)

- Select a wipe pattern. (See page 24 "Selecting Wipe Patterns".

5 Switching operations are identical with those described in B-a) 5 . The title will be wiped in as follows (assuming the ▨ pattern (NORMAL mode) is selected):


Wipe
Inputting start
Inputting in progress
Inputting completed

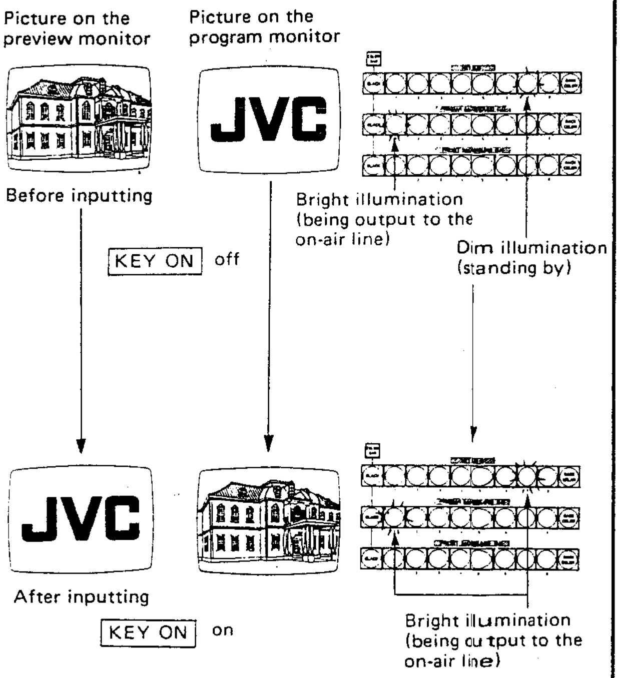
6 Operations for switching off the key effect are identical with those described in B-a) 6 . If the wipe mode NORMAL is selected, wiping out will be performed in the same direction as wiping in was performed. In the REVERSE mode, wiping out will be performed in the opposite direction.

B-c) To key in the CUT mode

- Steps should follow preparation steps 1 to 3 .

4 Press the CUT button. The title will be switched in instantly.

5 The monitor pictures and BUS select buttons illumination will change as follows:


Picture on the preview monitor
Picture on the program monitor
JVC
Before inputting
Bright illumination (being output to the on-air line)
Dim illumination (standing by)
KEY ON off
JVC
After inputting
KEY ON on
Bright illumination (being output to the on-air line)

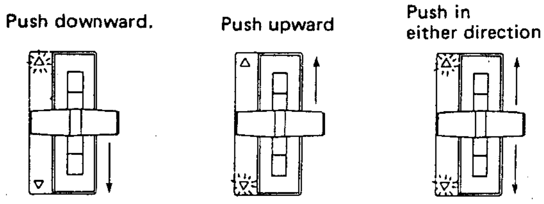
6 To switch the title off the program picture, press the CUT button once again. The title will disappear instantly. And at the same time the KEY ON indicator will turn off.

C. Simultaneous video switching A and keying B

– Switching on/off of a key effect (except chroma key) when the PROGRAM BACKGROUND BUS video is switched to the PRESET BACKGROUND BUS video –

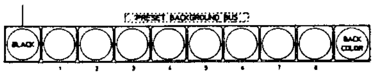
Preparation

1 If the FADER lever is positioned midway, fully push it in the direction opposite to that indicated by one of the LEDs to the left of the lever. There may be cases when both LEDs are lit. In such cases, push the lever fully in either direction.


Push downward.
Push upward
Push in either direction

2 Press the BKGD button. (The button will be illuminated.)

3 Select a desired picture by pressing the PRESET BACKGROUND BUS select buttons while referring to the preview monitor.



4 While pressing the BKGD button, press the KEY button.
(Make sure that both buttons are lit.)

5 If KEY ON is off, set a key effect while referring to the preview monitor. (See page 21.)

- If KEY ON is off, the following procedure will produce a key effect output to the on-air line simultaneously when the PROGRAM BACKGROUND BUS picture is switched to the PRESET BACKGROUND BUS picture.
- If KEY ON is lit, the key effect already on the air will be switched off simultaneously when the PROGRAM BACKGROUND BUS picture is switched to the PRESET BACKGROUND BUS picture.

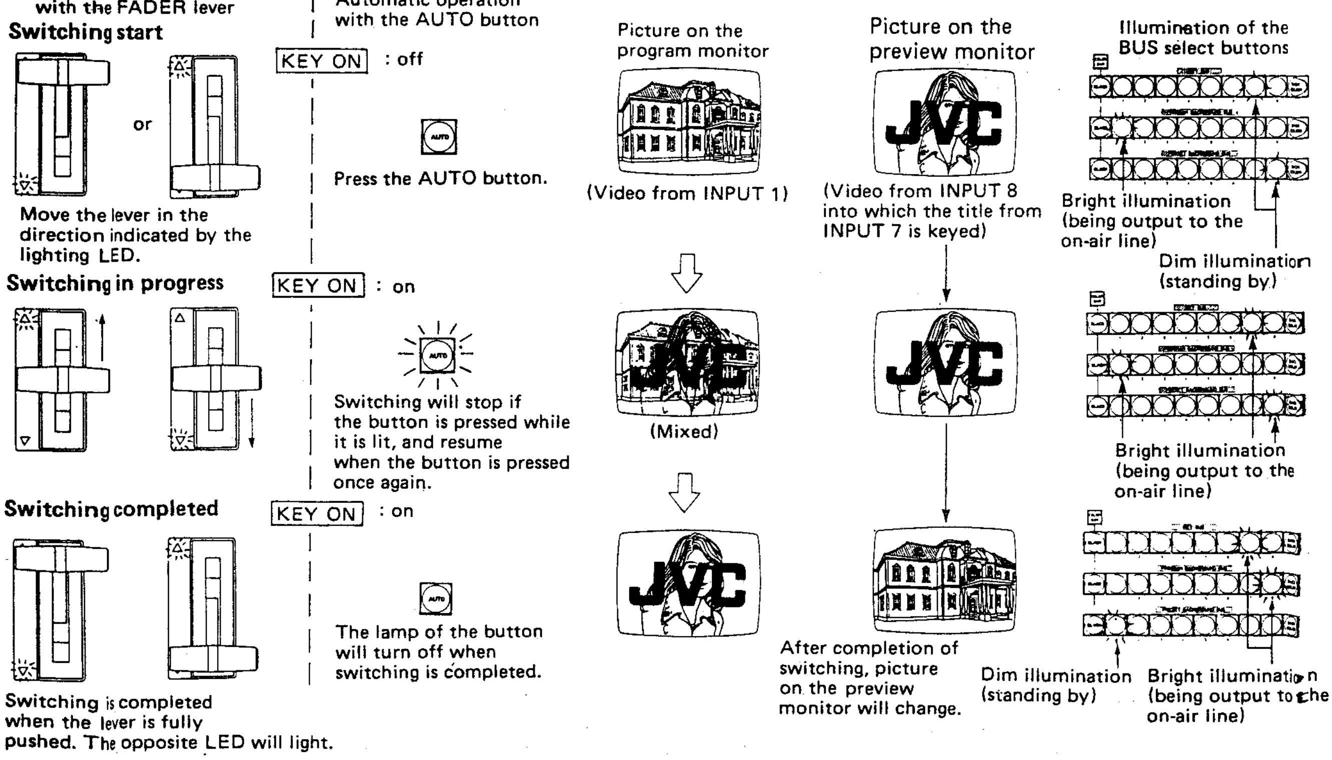
- Three switching and keying in/out modes a) – c) are available. These are described for an example in which INPUT 1 is selected on the PROGRAM BACKGROUND BUS, INPUT 8 is selected on the PRESET BACKGROUND BUS and a title input to INPUT 7 is to be keyed in.

C-a) To execute in the MIX mode

4 Press the MIX button. (The button will be illuminated.)

5 Switching can be done either manually or automatically.
Manual : Performed with the FADER lever.
Automatic : Performed automatically with the preset timing.

- For setting the timing, refer to page 26 "Setting the effect time".
- When the AUTO button is pressed in the middle of manual switching, automatic switching will start from the position where the FADER lever was stopped. (The lever will no longer move.)
- The picture being switched will not be displayed on the preview monitor.


Manual operation with the FADER lever
Automatic operation with the AUTO button
Switching start
KEY ON : off
or
Press the AUTO button.
Move the lever in the direction indicated by the lighting LED.
Switching in progress
KEY ON : on
Switching will stop if the button is pressed while it is lit, and resume when the button is pressed once again.
Switching completed
KEY ON : on
The lamp of the button will turn off when switching is completed.
Switching is completed when the lever is fully pushed. The opposite LED will light.
Picture on the program monitor
(Video from INPUT 1)
(Mixed)
JVC
Picture on the preview monitor
(Video from INPUT 8 into which the title from INPUT 7 is keyed)
After completion of switching, picture on the preview monitor will change.
Illumination of the BUS select buttons
Bright illumination (being output to the on-air line)
Dim illumination (standing by)
Bright illumination (being output to the on-air line)
Dim illumination (standing by)
Bright illumination (being output to the on-air line)

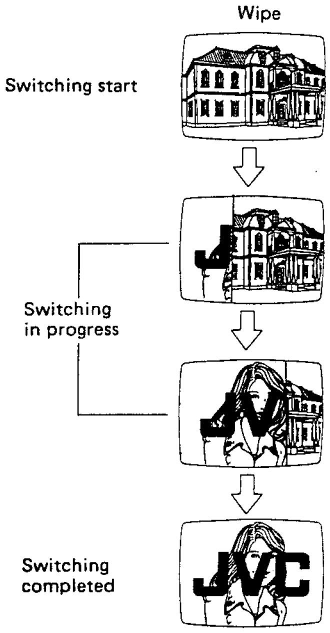
C-b) To execute in the WIPE mode

- Steps should follow preparation steps 1 to 3 .

4 Press the WIPE button. (The button will be illuminated.)

- Select a wipe pattern. (See page 24 "Selecting Wipe Patterns".

5 Switching operations are identical with those described in C-a) 5 . The picture on the program monitor changes as follows (assuming the ▨ pattern (NORMAL mode) is selected):

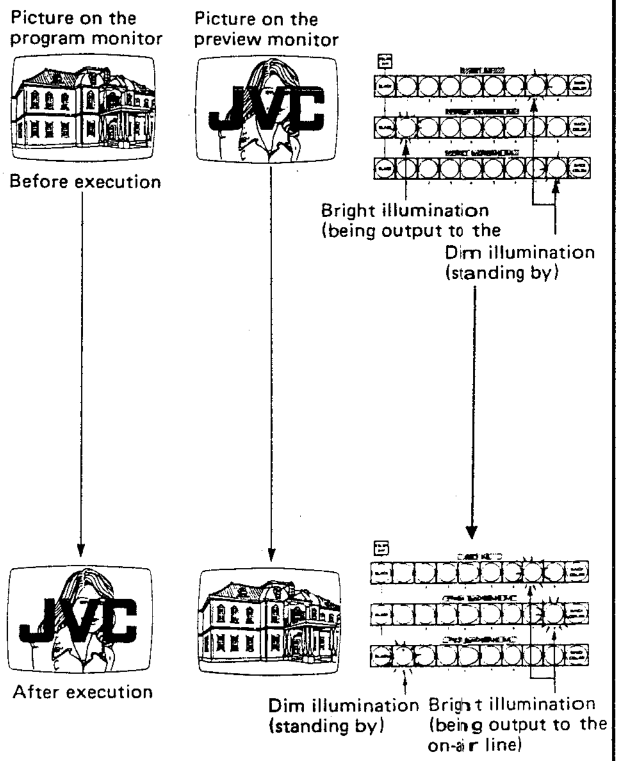

Wipe
Switching start
Switching in progress
Switching completed

C-c) To execute in the CUT mode

- Steps should follow preparation steps 1 to 3 .

4 Press the CUT button. The PROGRAM BACKGROUND BUS video will be switched to the PRESET BACKGROUND BUS video instantly and at the same time the title will be keyed in.

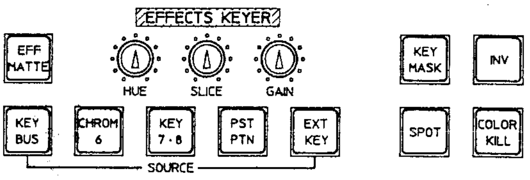
5 The monitor pictures and BUS select buttons illumination will change as follows:


Picture on the program monitor
Picture on the preview monitor
Before execution
Bright illumination (being output to the
Dim illumination (standing by)
After execution
Dim illumination (standing by)
Bright illumination (being output to the on-air line)

3. Key Setting

A variety of key effects can be set with the EFFECTS KEYER controls.

The term "keying" refers to video effects in which a part of the main (on-air) video selected on the PROGRAM BACKGROUND BUS is cut out and filled with an video selected on the KEY BUS or a single color preset by the COLOR MATTE controls. To cut out a part of the picture, a key hole signal is used. The video signal making a hole is called the key source and the video filling the hole is called the fill video.



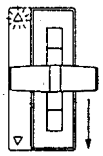
A. Basic settings

Preparation

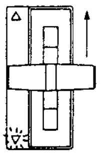
- Perform key settings while referring to the preview monitor.

1 If the FADER lever is positioned midway, fully push it in the direction opposite to that indicated by one of the LEDs to the left of the lever. There may be cases when both LEDs are lit. In such cases, push the lever fully in either direction.

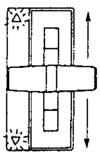
Push downward.



Push upward.



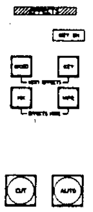
Push in either direction.



2 Press the KEY button in the EFFECTS section.

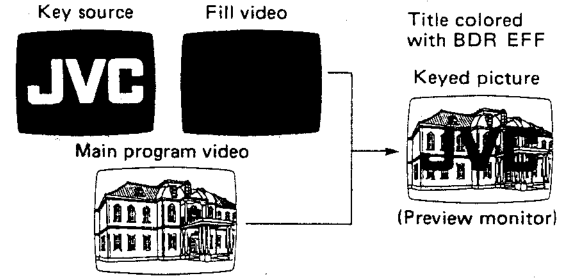
3 If KEY ON is lit, press the CUT button to turn it off.

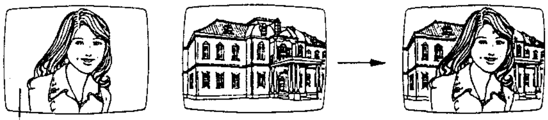
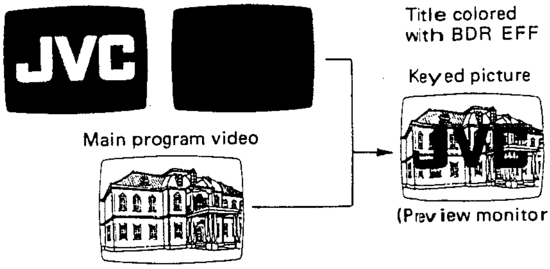
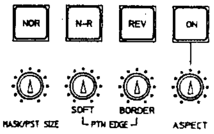
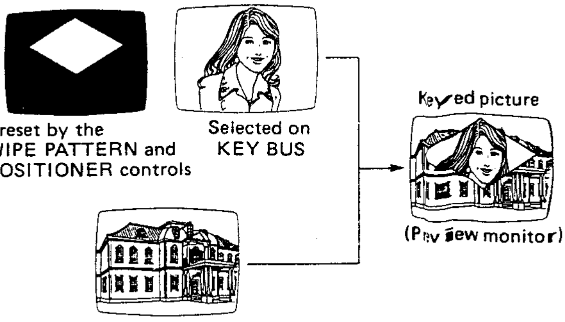
4 If the EFF MATTE button is not lit, press it to turn on.



5 Select a key source by pressing SOURCE buttons. (The pressed button will be illuminated.)

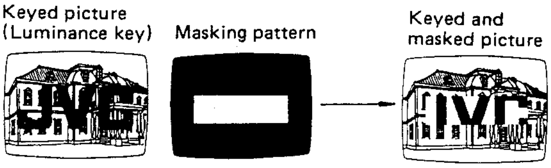
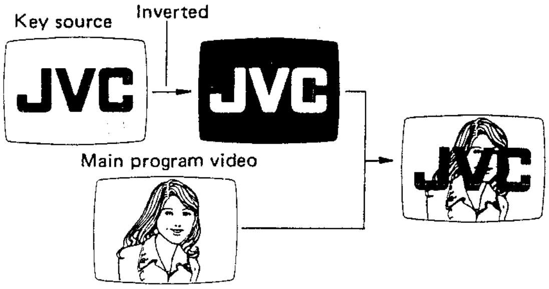
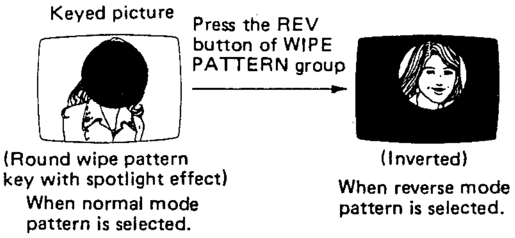
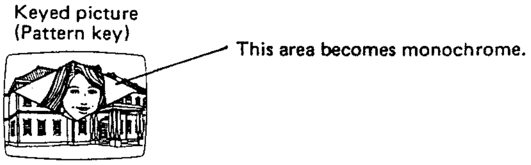
6 Setting procedure differs depending on the selected key source.

SOURCE button	Setting procedure	Selecting fill video
KEY BUS (Luminance key)	1) Turn the SLICE and GAIN controls fully clockwise. 2) Select a key source on the KEY BUS. (The Y signal of the selected video will be used as the key source.) 3) Turn the SLICE control counterclockwise; the keyed picture will appear on the preview monitor. Turn the GAIN control counterclockwise; the edge of the cut-out portion will be varied. 4) Turn both controls to obtain an optimum picture.	EFF MATTE If the EFF MATTE button is lit, the BRD EFF color preset by the COLOR MATTE controls will fill in the hole. With the EFF MATTE button not lit, the video selected on the KEY BUS will be the fill video. The button alternates on and off each time it is pressed. Example  Key source JVC Fill video Main program video Title colored with BDR EFF Keyed picture JVC (Preview monitor)
CHROM 6 (Chroma key)	A specified color of the video input to INPUT 6 functions as the key source. 1) Turn the HUE control to the center, and the SLICE and GAIN controls fully clockwise. 2) Select INPUT 6 on the PROGRAM BACKGROUND BUS.	EFF MATTE If the EFF MATTE button is lit, the BRD EFF color preset by the COLOR MATTE controls will fill in the hole. With the EFF MATTE button not lit, the video selected on the KEY BUS will be the fill video.

	3) Turn the SLICE control counterclockwise; the keyed picture will appear on the preview monitor. 4) Set a color to be the key source with the HUE control. 5) Turn the GAIN control to adjust the edge of the cut-out portion. 6) Turn the SLICE, HUE and GAIN controls to obtain an optimum picture.	The button alternates on and off each time it is pressed. **Note:** When using a KEY BUS video as the fill video, select an input other than INPUT 6. Example  Key source and main program video Fill video Keyed picture Blue background (Preview monitor) Adjust with the HUE control so that the blue background is replaced with the fill video.
KEY 7, 8 (Luminance key)	- Will not function if an input other than 7 or 8 is selected on the KEY BUS. Be sure to select INPUT 7 or 8. The key source corresponds to the selected input. 1) Turn the SLICE and GAIN controls fully clockwise. 2) Turn the SLICE control counterclockwises; the keyed picture will appear on the preview monitor. Turn the GAIN control counterclockwise; the edge of the cut-out portion will be varied. 3) Turn both controls to obtain an optimum picture.	EFF MATTE: If the EFF MATTE button is lit, the BRD EFF color preset by the COLOR MATTE controls will fill in the hole. With the EFF MATTE button not lit, the video selected on the KEY BUS will be the fill video. The button alternates on and off each time it is pressed. Example  Key source Fill video JVC Title colored with BDR EFF Keyed picture Main program video (Preview monitor)
PST PTN (Pattern key)	- A wipe pattern selected in the WIPE PATTERN section becomes a key source. 1) Set the MASK/PST SIZE control in the WIPE PATTERN section to the center. 2) Select a wipe pattern (See page 24). 3) Set the wipe pattern to a desired size with the MASK/PST SIZE control. 4) The SOFT, ASPECT and BORDER controls and the POSITIONER controls are all effective. Adjust the pattern using these controls.  NOR N-R REV ON SOFT BORDER MASK/PST SIZE PTN EDGE ASPECT	EFF MATTE: If the EFF MATTE button is lit, the BRD EFF color preset by the COLOR MATTE controls will fill in the hole. With the EFF MATTE button not lit, the video selected on the KEY BUS will be the fill video. The button alternates on and off each time it is pressed. **Note:** With the EFF MATTE button lit, the border will not appear even when the BORDER control is turned. Example  Key source Fill video Preset by the WIPE PATTERN and POSITIONER controls Selected on KEY BUS Keyed picture (Preview monitor) Main program video

SOURCE button	Setting procedure	Selecting fill video
EXT KEY (Luminance key)	● The black-and-white signal applied to the rear panel EXT KEY INPUT connectors as the key source. ● Setting procedure is idential with that for KEY 7, 8.	Refer to item KEY 7, 8.

B. Setting Key Effects
The following effects can be used in combination.

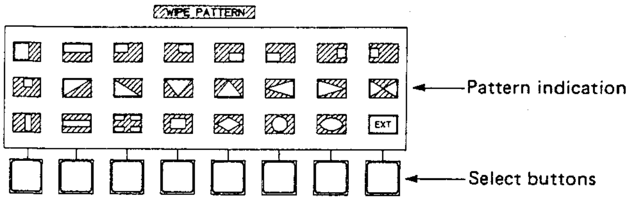
Effect	Setting procedure	Example
Masking	● In luminance and chroma keys, the part not to be keyed can be masked with a preset wipe pattern. 1) Press the KEY MASK button. (The button will be illuminated.) 2) Select a wipe pattern. See page 24. 3) Set the area to be masked with the MASK/PST SIZE control in the WIPE PATTERN section.	 Keyed picture (Luminance key) Masking pattern Keyed and masked picture JVC
Inverting	● The key source signal is reversed into a negative, producing an inverted key. 1) Press the INV button. (The button will be illuminated.) 2) The key source signal will be reversed and an inverted key will be produced.	 Key source Inverted JVC JVC Main program video JVC
Spotlight effect	● The keyed area's brightness can be reduced to an half, producing a spotlight effect on the main program video. 1) Press the SPOT button. (The button will be illuminated.) 2) Select the same input on the PROGRAM BACKGROUND BUS and KEY BUS, and execute a pattern key (PST PTN); the spotlight effect will be produced.	 Keyed picture Press the REV button of WIPE PATTERN group (Round wipe pattern key with spotlight effect) When normal mode pattern is selected. (Inverted) When reverse mode pattern is selected.
Monochrome effect	● The keyed area can be made monochrome by killing the color components. 1) Press the COLOR KILL button. (The button will be illuminated.) 2) A monochrome key will be produced.	 Keyed picture (Pattern key) This area becomes monochrome.

4. Wipe Pattern Setting

To produce a wipe with the EFFECTS controls, or a pattern key and a masking effect with the EFFECTS KEYER controls, select a wipe pattern using the WIPE PATTERN and POSITIONER controls.

A. Selecting a wipe pattern

1 Press a button under the desired pattern indication a couple of times until the desired pattern indication is illuminated.



- If the EXT indication is selected, the wipe pattern input to the rear panel EXT WIPE INPUT connector can be used.

2 Select a wipe mode.

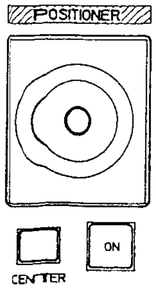
Mode	Procedure
Normal	1) Press the NOR button. (The button will be illuminated.) 2) The wipe pattern will move in the direction in which the white area increases.
Normal-Reverse	1) Press the N-R button. (The button will be illuminated.) 2) The wipe pattern movement will change its direction for each wipe. ● This mode has nothing to do with keying on/off, pattern keys and masking effects. ● The mode changes to the Nomral mode automatically, when keying on/off is performed with this mode.
Reverse	1) Press the REV button. (The button will be illuminated.) 2) The wipe pattern will move in the direction in which the black area increases.

B. Adjusting a wipe pattern

Control	Procedure
MASK/PST SIZE	Adjusts the size of a pattern used for a pattern key or masking. Refer to relevant sections.
SOFT	Adjusts the softness of the edge of a pattern. Turning it clockwise makes the edge softer. The function is switched off when the control is turned fully counterclockwise.
BORDER	Creates a border along the edge of a pattern. Turning it clockwise makes the border thicker. The function is switched off when the control is turned fully counterclockwise. The color of the border can be adjusted with the COLOR MATTE controls.
ASPECT ON	Press the ON button so that it is illuminated. Then the aspect ratio of a pattern can be adjusted with the ASPECT control. When the control is turned clockwise beyond the center position, the pattern can be compressed or expanded horizontally; when it is turned counterclockwise beyond the center position, the pattern can be compressed or expanded vertically. This function is effective for all patterns.

C. Using POSITIONER controls

The position of wipe patterns can be shifted with the POSITIONER controls. This function is effective for all wipe effects, pattern keys and masking effects. However, a different position cannot be used for each effect.
Positioning is effective for all wipe patterns.



1 Press the ON button.
(The button will be illuminated.)

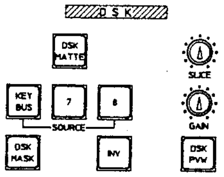
2 Operate the stick to move the pattern.
- The pattern will move in the direction in which the stick is turned.
- The moving speed is proportional to the angle at which the stick is inclined.

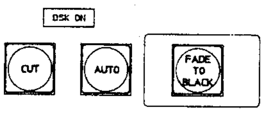
3 To turn off the POSITIONER controls, press the ON button once again. The wipe pattern will return to the original position. (The button will turn off.)

- The adjusted position is held in memory while the POSITIONER ON button is off. When the ON button is pressed again, the pattern will move to the adjusted position. To re-adjust it from the original position, press the CENTER button first; the pattern will return to the original position. The CENTER button functions whether the ON button is on or off.
- With some patterns, if the adjusted position is excessively away from the original, execution of a wipe with the FADER lever may be the same as that with the CUT button.

5. DSK Setting

DSK stands for a downstream keyer which performs keying immediately before the program video is output to the on-air line.





A. Basic settings

Preparation

- Perform DSK settings while referring to the preview monitor.

1 Press the DSK PVW button.
(The button will be illuminated.)
2 If DSK ON is lit, press the CUT button to turn it off.
3 Turn the SLICE and GAIN controls fully clockwise.
4 If the DSK MATTE button is off, press it to turn it on.

5 Select a DSK source by pressing one of the SOURCE buttons. (The pressed button will be illuminated.)
6 Turn the SLICE and GAIN controls to obtain an optimum picture.
- Turning the SLICE control counterclockwise will produce a keyed picture.
- Turning the GAIN control counterclockwise will vary the edge of the cut-out area.

7 Select a fill video.
- When the DSK MATTE button is lit, the DSK color preset by the COLOR MATTE controls becomes the fill video.
- When the DSK MATTE button is off, the fill video can be selected from the following chart.

SOURCE button	DSK source	Fill video (with DSK MATTE off)
KEY BUS	● The Y signal of the video selected on the KEY BUS is the DSK source.	● The video selected on the KEY BUS is inserted in the program output as the fill video.
7	● The signal input to the rear panel KEY 7* connector is the DSK source. This signal is available only when INPUT 7 is selected on the KEY BUS.	● The video input to the rear panel INPUT 7 becomes the fill video. Be sure to select INPUT 7 on the KEY BUS.
8	● The signal input to the rear panel KEY 8* connector is the DSK source. This signal is available only when INPUT 8 is selected on the KEY BUS.	● The video input to the rear panel INPUT 8 becomes the fill video. Be sure to select INPUT 8 on the KEY BUS.

* The DSK source can be changed to the Y signal of INPUT 7 or 8 respectively by internal switching. For modification consult a JVC-authorized service agent.

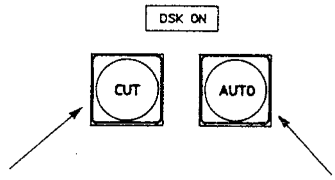
B. Setting DSK effects

The effects described here can be used in combination.

Effect	Setting procedure
Masking	● The area not to be keyed can be masked out with a preset wipe pattern. 1) Press the DSK MASK button. (The button will be illuminated.) 2) Select a suitable wipe pattern. See page 24. 3) Set the area to be masked by using the MASK/PST SIZE control in the WIPE PATTERN section.
Source inversion	● The key source signal becomes negative, producing a reversed keyed area. 1) Press the INV button. (The button will be illuminated.) 2) The key source becomes negative and the keyed area is inverted.

C. DSK execution

Use either one of the following two buttons:



The DSK will be instantly output when this button is pressed and the button will be illuminated. When pressed again, the DSK will be switched out of the program output instantly and the button will turn off..

The DSK will be output with the timing preset by the DURATION controls, when this button is pressed. After completion of feed, DSK ON will light. When the button is pressed again, the key will be switched out of the program output with the same timing as in switching in. After completion of switching out, DSK ON will turn off.

Applied Techniques

6. Fading

The program output can be faded out and in.

1 Press the FADE TO BLACK button. The program output will fade out in the time preset by the DUARATION controls.
The picture on both the program and preview monitors will fade out. After completion of fade-out, the FADE TO BLACK button will be illuminated. At the same time, the picture on the preview monitor changes to that of the original program.

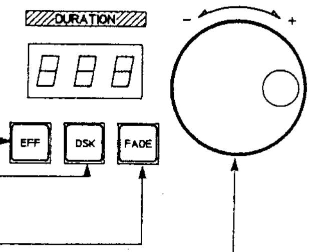
2 To fade in, press the FADE TO BLACK button again. When fade-in starts, the button will turn off. The picture on the preview monitor returns to the original after completion of fade-in.

7. Setting the Effect Times

A. Setting Procedure

1 Select the item for which the time is to be set.
Press one of the following buttons. The pressed button will blink.

- For setting the time of automatic execution triggered by the AUTO button in the EFFECTS section.
- For setting the time of automatic execution triggered by the AUTO button in the DSK section.
- For setting the time of fade-out/fade-in triggered by the FADE TO BLACK button.

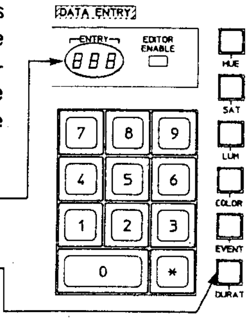


2 The time can be entered in two ways:

(1) Using the rotary dial
To increase the time indicated on the display to the left of the dial, turn the dial clockwise while the button is blinking. To decrease the time, turn it counterclockwise. The time can be set from "000" to "999". 4 seconds after the dial is stopped, the button will stop blinking and remain lit. The display now will be locked and will not change even if the dial is turned further. If you wish to change the setting, press the item select button once again so that it starts blinking.

Note:
The effect time is displayed as a number of frames. This can be changed to a number of seconds (as explained later).

(2) Using the 10-digit keypad
Enter the required time (in frames) by pressing the corresponding numeric keys. For example, enter "025" for 25 frames. The entered number will be displayed on the ENTRY display. This entry will be transferred to the DURATION section and displayed on the display by the rotary dial by pressing the DURAT button.



ENTRY display

DURAT button

- Entering the time in seconds is not possible

B. Display Modes of Effect Times

The display by the rotary dial indicates the time in frames when the power is switched on. This can be changed as follows by using the 10-digit keypad.

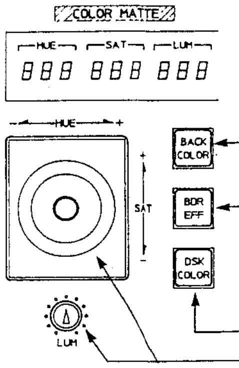
10-Key operation	Display mode
Press * and 3 simultaneously.	"Seconds" display mode will be engaged. Example 03.3 3.3 seconds
Press * and 2 simultaneously.	"Seconds and frames" display mode will be engaged. Example 3.10 3 seconds and 10 frames
Press * and 1 simultaneously.	"Frames" display mode will be re-engaged. Example 100 100 frames

8. Storing, Reading and Entering Data

A. Presetting color signals

To preset color signals for different purposes, use the COLOR MATTE controls.

1 Select the item for which the color signal is to be preset by pressing one of the following buttons: The button pressed will be iluminated.



For setting the BACK COLOR selected on each BUS.

For setting the color of the border of wipes and pattern keys and the EFF MATTE color in the EFFECTS KEYER section.

For setting the DSK MATTE color.

2 The color can be set in two ways.

(1) Using the stick and the LUM control

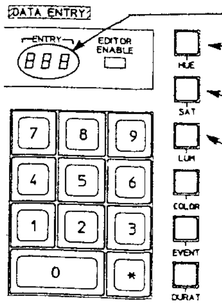
- Titling the stick horizontally changes the hue. The hue setting will be displayed on the display section HUE above the stick in the range from "000" to "359" in degrees.
- Titling the stick vertically changes the saturation. The saturation setting will be displayed on the display section SAT in the range from "000" to "130" in IRE. No color is available if SAT shows "000".

> The greater the inclination of the stick, the faster the change of the color.

- Turning the LUM control changes the brightness level. The brightness setting will be displayed on the LUM display section in the range from "000" to "130" in IRE.

(2) Using the 10-digit keypad

Enter the required data. For example, enter "075" for 75. The data will be displayed on the ENTRY display above the 10-digit keypad. Press the corresponding button (HUE, SAT and LUM) by the 10-digit keypad to transfer the data to respective displays above the stick.



ENTRY display

Press this to register the displayed data as the hue setting.

Press this to register the displayed data as the saturation setting.

Press this to register the displayed data as the brightness setting.

3 These settings can be held in color memory so that they are retained even after the power is switched off. They can be called up later. For details refer to page 27 "Color Memory".

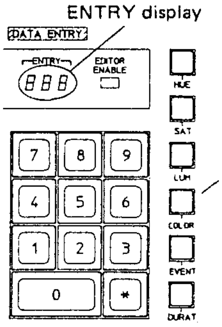
B. Color Memory

The settings made in A, can be stored in the KM-3000's built-in color memory. The stored data is retained even after the power is switched off. The color memory has a capacity for 24 colors; 9 of them are preset colors and 15 are user-specified colors. Memories from "00" to "08" are for preset colors and from "09" to "23" are for user-specified colors.

Preset colors

00	Black	Color levels conform to the standard color bars.
01	Blue	
02	Red	
03	Magents	
04	Green	
05	Cyan	
06	Yellow	
07	White 75%	
08	White 100%	

Selecting an color memory number



1 Enter the desired number using the 10-digit keypad.

- To select memory "08" for example, enter "008". The entered data will be displayed in the ENTRY display.

2 Press the COLOR button by the 10-digit keypad to transfer the data to the COLOR display; the corresponding memory will be called up.

To store data, use the four buttons below the display section COLOR.

Storing into the Color Memory

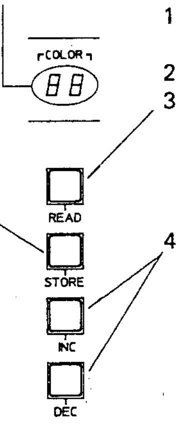
1 First set the color according to the procedure described previously.

2 Select a memory number using the 10-digit keypad.

Note: Writing to memories "00" to "08" is not possible.

3 Press the STORE button; the COLOR display will blink once to show that the data has been stored.

- The stored color can be used for different purposes regardless of the item selected when setting the color. For example, the color set as the BACK COLOR can be used as the BDR EFF (border or EFF MATTE) or DSK MATTE color.



Calling the Stored Color

1 Select the item for which you want to call the data according to the procedure described previously.

2 Call the memory number you need.

3 Press the READ button; the COLOR display will blink once and the pre-set color will be called up.

- If the called-up memory is empty, the COLOR display will not blink and the same color as before will be retained.

4 Memories can also be called up by using the INC and DEC buttons.

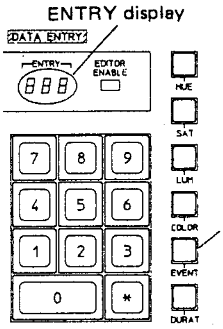
INC: Each time the button is pressed, the memory one number higher than the current one is called up.

DEC: Each time the button is pressed, the memory one number lower, than the current one is called up.

If no color is written in the called-up memory, the previous color setting is retained.

C. Event Memory

The ON/OFF settings of all buttons, can be held in memory as one event. A total of 16 events can be stored and retained even after the power is switched off. To operate the event memory, use the four buttons below the EVENT display.



Selecting an event memory number

1 Enter the desired number using the 10-digit keypad.

- To select memory "08" for example, enter "008". The entered data will be displayed in the ENTRY display.

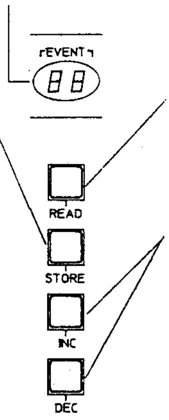
2 Press the EVENT button by the 10-digit keypad to transfer to data to the EVENT display; the correspond-

Storing into an Event Memory

1 Set the buttons.

2 Select the event memory number in which the event is to be stored.

3 Press the STORE button; the EVENT display will blink once to show that the event has been stored.



Calling up an Event Memory

1 Select the event memory number you want to call up.

2 Call up the required memory number.

3 Press the READ button; the EVENT display will blink once and the pre-set event will be called up.

- If the called memory is empty, the EVENT display will not blink and the same setting of buttons and controls as before will be retained.

4 Memories can also be called up by using the INC and DEC buttons.

INC: Each time the button is pressed, a memory one number higher than the current one is called up.

DEC: Each time the button is pressed, a memory one number-longer than the current one is called up.

If no event is written in the called memory, the previous setting will be retained.

OTHER FUNCTIONS

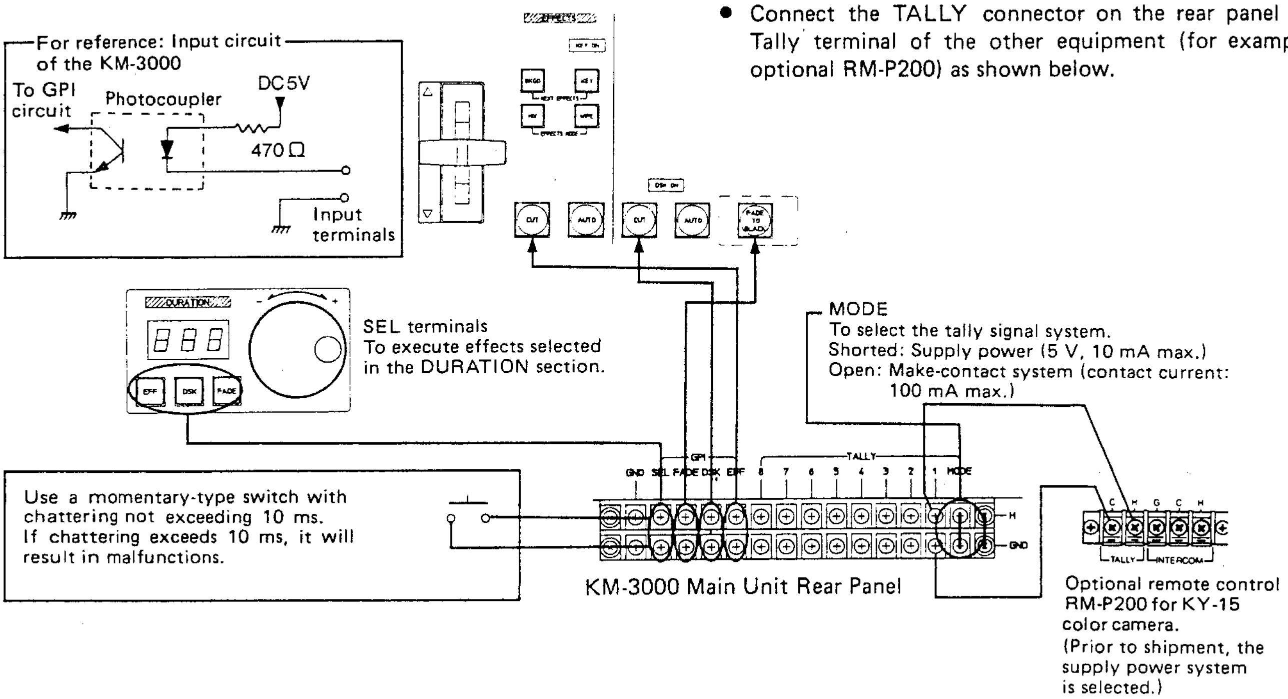
GPI (General Purpose Interface) connections

By connecting switches to these terminals to execute KM-3000 effects. These switches function in the same way as the buttons on the control unit of the KM-3000.

TALLY connections

In a video system using more than one camera, it is necessary to indicate the camera operators and actors which cameras are on-the-air. This function is performed by the tally signal.

- Connect the TALLY connector on the rear panel to the Tally terminal of the other equipment (for example the optional RM-P200) as shown below.



SEL terminals
To execute effects selected in the DURATION section.

MODE
To select the tally signal system.
Shorted: Supply power (5 V, 10 mA max.)
Open: Make-contact system (contact current: 100 mA max.)

Use a momentary-type switch with chattering not exceeding 10 ms.
If chattering exceeds 10 ms, it will result in malfunctions.

KM-3000 Main Unit Rear Panel

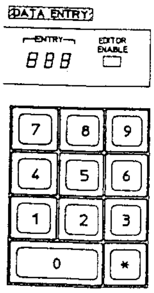
Optional remote control RM-P200 for KY-15 color camera.
(Prior to shipment, the supply power system is selected.)

Connecting to an Editing Controller

The multiple functions of the KM-3000 can be controlled with command signals from the Editing Controller.

(1) Connect an editing controller to the TO EDITOR connector (D-SUB 9-pin, female) on the rear panel of the KM-3000. Obtain an appropriate cable depending on the editing controller used.

(2) With some editing controllers, it may be necessary to reset internal switches of the KM-3000. Consult the dealer from whom you purchased the unit.



(3) Press "*" and "0" of the 10-digit keypad simultaneously, and the EDITOR ENABLE lamp above the 10-digit keypad will light and the KM-3000's functions will be able to be controlled from the editing controller.

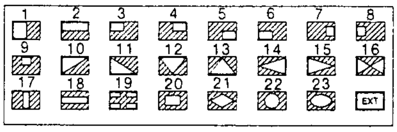
When it becomes unnecessary to control the KM-3000 from the editing controller, press "*" and "0" simultaneously to turn the EDITOR ENABLE lamp off.

- When the EDITOR ENABLE lamp is on, direct control of the KM-3000 is also possible.
- EDITOR control and GPI control can be used at the same time.
- If the MI-F30 auto-fader unit (optional) is connected to the KM-3000, the MI-F30 can also be controlled together with the KM-3000.

(4) The following commands are accepted by the KM-3000:

1. Cross-point setting (KEY BUS, PROGRAM BACKGROUND BUS, PRESET BACKGROUND BUS)
2. ON/OFF setting of pushbutton controls
3. Wipe pattern setting

   Wipe codes corresponding to wipe patterns (expressed in the decimal system):



4. Effect time setting (EFF, DSK, FADE)

- Adjustment controls, FADER lever, POSITIONER and HUE/SAT stick must be set directly on the control unit of the KM-3000.

Audio Interface

By connecting the MI-F30 auto-fader unit (option of the optional MI-3000 audio mixer) to the TO AUDIO INTERFACE connector on the rear of the KM-3000's control unit, audio follow-up video operation (simultaneously switching of picture and sound) can be performed. For connection and operation of the MI-3000 and MI-F30, refer to the instruction manual of the relevant units.

Switching On/Off the Buzzer

By pressing "*" and "4" of the 10-digit keypad simultaneously, the audible alarm system can be switched on and off. When the system is on, each time any of the buttons is pressed, the buzzer gives one beep.

SPECIFICATIONS

Video Inputs:
PROGRAM x 8 Y: 1 Vp-p, 75 Ω
R-Y/B-Y; 0,7 Vp-p (100 % Color bars), 75 Ω (NTSC/PAL)
0.525 Vp-p (75 % Color bars), 75 Ω (PAL)
0.486 Vp-p (USA 75 % Color bars), 75 Ω (NTSC)
(Inputs 6, 7, 8 can accept R/G/B signal by selection.)
KEY x 2 VB 0.7 Vp-p, 75 Ω (Inputs 7, 8 have key input.)
EXT KEY x 1 VB; 0.7 Vp-p, 75 Ω or high
EXT WIPE x 1 VB; 0.7 Vp-p, 75 Ω or high

Video outputs:
PROGRAM
COMPONENT x 2 Y: 1 Vp-p, 75 Ω
R-Y/B-Y; 0.7 Vp-p (100 % Color bars), 75 Ω (NTSC/PAL)
0.525 Vp-p (75 % Color bars), 75 Ω (PAL)
0.486 Vp-p (USA 75 % Color bars), 75 Ω (NTSC)
(PGM 2 is switchable to key bus output.)
COMPOSITE x 1 VBS: 1 Vp-p, 75 Ω
Y/C OUTPUT x 1 Y: 1 Vp-p, 75 Ω
C: 0.286 Vp-p, 75 Ω (Burst level)
(Y/C 358 or Y/C 688 for NTSC, Y/C 443 for PAL.)
PREVIEW
COMPONENT x 1 Y: 1 Vp-p, 75 Ω
R-Y/B-Y; 0.7 Vp-p (100 % Color bars), 75 Ω (NTSC/PAL)
0.525 Vp-p (75 % Color bars), 75 Ω (PAL)
0.486 Vp-p (USA 75 % Color bars), 75 Ω (NTSC)
COMPOSITE x 1 VBS: 1 Vp-p, 75 Ω
KEY HOLE x 1 VB: 0.7 Vp-p, 75 Ω

Gen lock input
B.B. x 1 BB: 0.43 Vp-p (NTSC)/0.45 Vp-p (PAL), 75 Ω or high

Sync output
B.B. x 3 B.B: 0.43 Vp-p (NTSC)/0.45 Vp-p (PAL), 75 Ω

Fader output
Fader DC voltage x 1 0 to 5 V DC

Wipe patterns: 23 Patterns

Connectors
Main unit VIDEO: BNC, Y/C; 7P metal, GPI: RCA terminal,
Control unit; 9P D-sub, Editor: 9P D-sub
Control unit Audio interface; 9P D-sub (forMI-F30)
Main unit: 9P D-sub

Frequency response: 60 to 5.5 MHz/±0.3 dB
Delay difference: ±25 ns between channels
Signal to noise ratio: More than 60 dB
TV standard: NTSC (RS-170A), PAL
Power consumption: 120 V AC for U type, 220/240 V AC for E type, 50/60 Hz 95 W (main unit), 28 W (control unit)

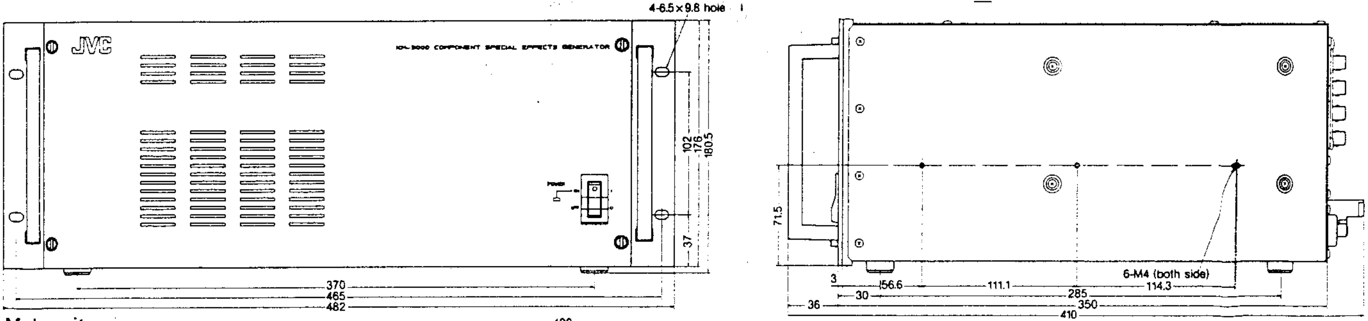
Temperature range
Operating: 5°C to 40°C (41°F to 104°F)
Storage: 20°C to 60°C (-4°F to 140°F)

Dimensions: Control unit; 482(W) x 150.5(H) x 310(D) mm
(19" x 5-15/16" x 12-1/4")
Main unit; 482(W) x 180.5(H). x 410(D) mm
(19" x 7-1/8" x 16-3/16")

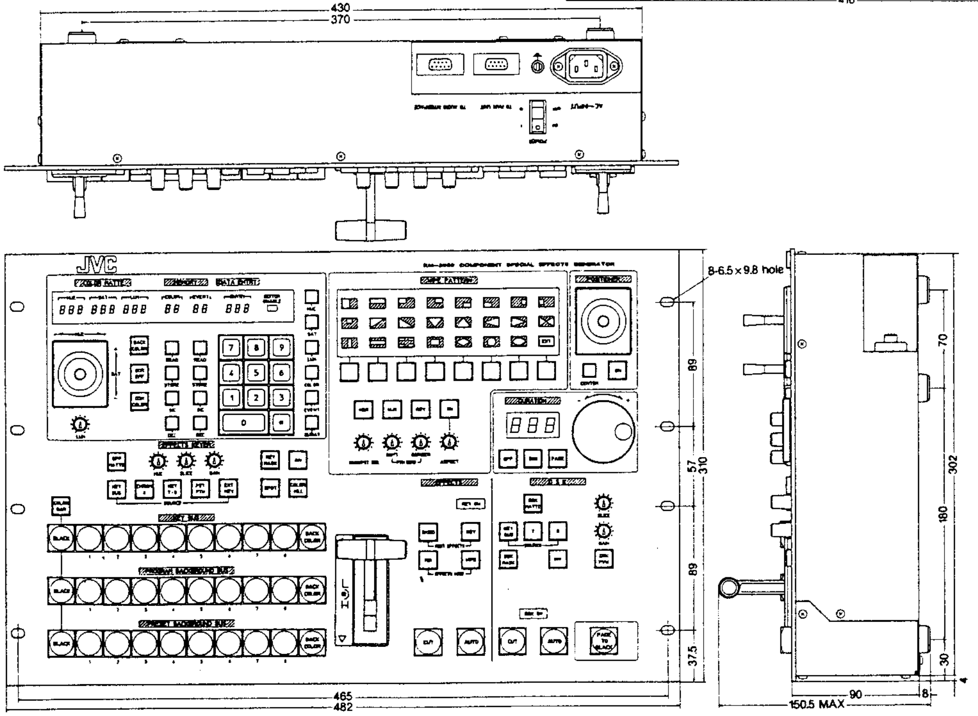
Weight: Control unit; 6.5 kg (14.4 lbs.)
Main unit: 14.5 kg (32 lbs.)

Accessories
Cable Assembly: SCV1423-10M, 10 m/32 f, 1 pcs.
Termination Plug: SCV0286-001, 3 pcs.
Power Cord: U type ; QMP9003-002, 2 pcs.
EA type ; SCV0420-2M5, 2 pcs.
EK type ; SCV0419-2M5, 2 pcs.
EG type ; QMP4908-250, 2 pcs.
Title Sheet: SC31117-001, 1 sheet

- The video output signal (component) of the KM-3000 conforms to the specifications of MII video recorders. Internal modifications and adjustments (f ee is charged) are necessary to obtain video signals conforming to other standards.



Main unit



Control unit

(unit: mm)

Design and specifications subject to change without notice.

JVC

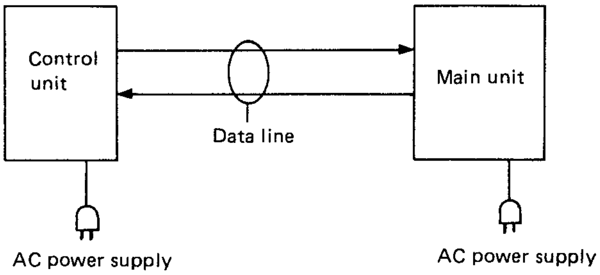
VICTOR COMPANY OF JAPAN, LIMITED

Printed in Japan

SECTION 1
CIRCUIT DESCRIPTION

The KM-3000 consists of a main unit and a control unit. As these units have independent power supplies, the only cable which connects the two units contains the two serial data lines used for transmission and reception.

Both the main and control units have built-in CPUs, and they interact with each other by serial communications. As the signal line complies with RS-422, with compatible software, the KM-3000 can be controlled by an external unit (for example, an editor).



The roles of the two CPUs are as follows:

a) Control unit

1. The state of the buttons, knobs, and levers on the panel is detected and and converted into data.
2. This data is transmitted to the main unit.
3. Data is received from the main unit.
4. Lamps and indicators on the front panel are lit.

b) Main unit

1. Data is received from the control unit
2. Input video signals are processed using the above data and output
3. Data indicating that processing has been performed is transmitted to the control unit.

In the schematic diagram the following function blocks are indicated.

a) Control unit

1. Detection of on/off of buttons using the key matrix circuit.
2. Positions of knobs and levers is converted into data using the A/D converter.
3. Communication with the main unit using the CPU.

b) Main unit

1. Processing of video signals using various effect amplifiers.
2. Generation of control signals and various waveforms using various effect amplifiers.
3. Generation of reference signals using the SSG and genlocking.
4. Communication with the control unit using the CPU and control of 1 and 2 above.

For example, if a button on the panel is pressed, the information that the button is pressed is sent from the CPU in the control unit to the CPU in the main unit. The CPU in the main unit performs processing of video signals in accordance with the button pressed. Upon completion of processing, "processing complete" data is sent from the main unit to the control unit, and the corresponding lamp in the button is lit.

1. CONTROL UNIT

The circuit board configuration of the control unit is as follows:

1. CPS circuit board
2. CM circuit board
3. WI circuit board
4. FC circuit board
5. TK circuit board
6. DI circuit board

circuit boards 1 to 5 are responsible for the detection of button, knob and lever settings, and lighting of the lamps and indicators on the panel. The DI circuit board is responsible for controlling each circuit board including the CPU and communications with the main unit.

1.1 CPS (Cross-Point Select) CIRCUIT BOARD

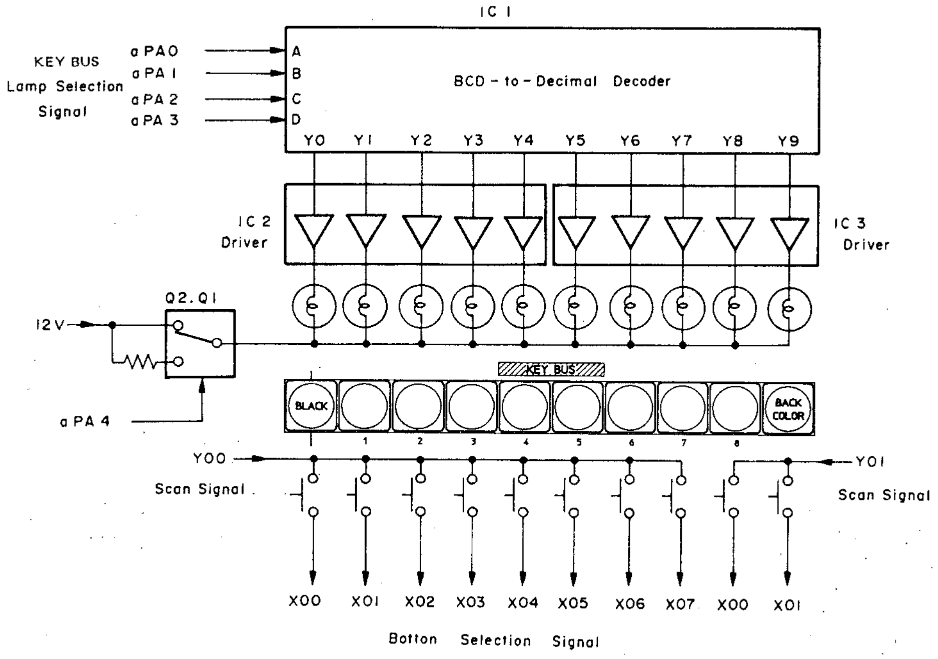

IC 1
KEY BUS
Lamp Selection
Signal
a PA 0
a PA 1
a PA 2
a PA 3
A
B
C
D
BCD - to - Decimal Decoder
Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9
IC 2
Driver
IC 3
Driver
Q2.Q1
12V
a PA 4
KEY BUS
BLACK
BACK COLOR
1 2 3 4 5 6 7 8
Y00
Scan Signal
Y01
Scan Signal
X00 X01 X02 X03 X04 X05 X06 X07 X00 X01
Botton Selection Signal

Fig. 1-1

The CPS circuit board sends the on/off state of the select buttons of each bus (KEY, PROGRAM, PRESET) to the DI circuit board, and receives the lamp select signal to light the lamp corresponding to the button depressed from the DI circuit board. For the detection method of button on/off, refer to the description of the key matrix. Fig. 1-1 shows the relation between the scanning signal (scan signal) of the key bus select button and the select signal (button selection) to be fed to each button.

The lamp to be lit is selected by lamp selection signals aPA0 to aPA3. aPA0 to aPA3 are output from the I/O port in the specified combination corresponding to the button depressed, by CPU commands. These signals are decoded by IC1, then switch on the corresponding lamp drivers (IC2, IC3) and light the lamp.

The correspondence between the lamp selection signals and the lamps lit is shown in the table below.

aPA 4 is a lamp dimmer. This signal is used to illuminate the selected KEY BUS button brightly when the key bus video signal is output to the main bus (on-air bus). aPA4 switches Q1 and Q2 to switch the lamp brightness in two steps.

This is done by aPA5 on the PROGRAM BUS, and aPA6 on the PRESET BUS.

		LAMP SELECT SIGNAL				
BUS	KEY BUS	aPA3	aPA2	aPA1	aPA0	LAMP to light
	PGM BUS	aPB3	aPB2	aPB1	aPB0	
	PST BUS	aPB7	aPB6	aPB5	aPB4	
		0	0	0	0	BLACK
		0	0	0	1	INPUT 1
		0	0	1	0	INPUT 2
		0	0	1	1	INPUT 3
		0	1	0	0	INPUT 4
		0	1	0	1	INPUT 5
		0	1	1	0	INPUT 6
		0	1	1	1	INPUT 7
		1	0	0	0	INPUT 8
		1	0	0	1	BACK COLOR

Table 1-1

1.2 CM (Color Matte) CIRCUIT BOARD

The information on the position of the knobs and button on/off settings on the control panel shown below is sent to the DI circuit board. The lamps in the display and buttons are lit by lighting information from the DI circuit board.

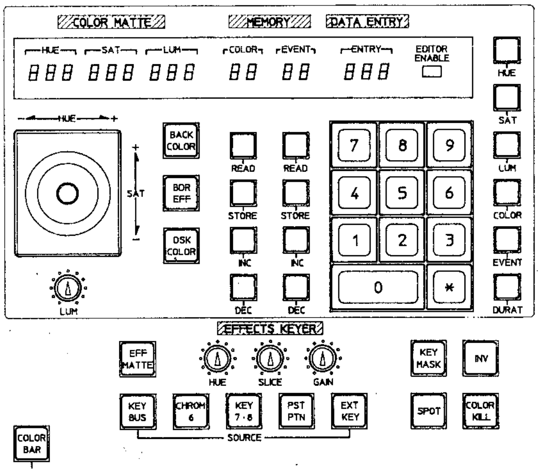

COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
888 888 888
88 88
888
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
7
8
9
4
5
6
1
2
3
0
*
DURAT
EFFECTS KEYER
EFF MATTE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
COLOR BAR

Fig. 1-2

1.2.1 EFFECTS KEYER and COLOR BAR button

For the detection method of button on/off, refer to the description of the key matrix. Fig. 1-3 shows the scanning signals (scan signal) and selection signals (button selection).

The lamp comes on when the lamp drive signal (lamp driver) from the DI circuit board goes low. Lighting is controlled by the CPU on the DI circuit board.

The position information from the HUE/SLICE/GAIN knobs is sent to the DI circuit board as a DC value with a level of 0 V to 5 V. The DI circuit board encodes these signals into a digital signal which is then sent to the CPU. The 5 V (C5V) power to be fed to each knob is regulated 5 V power produced by the local power supply on the DI circuit board and is different from the 5V power for lamp lighting.

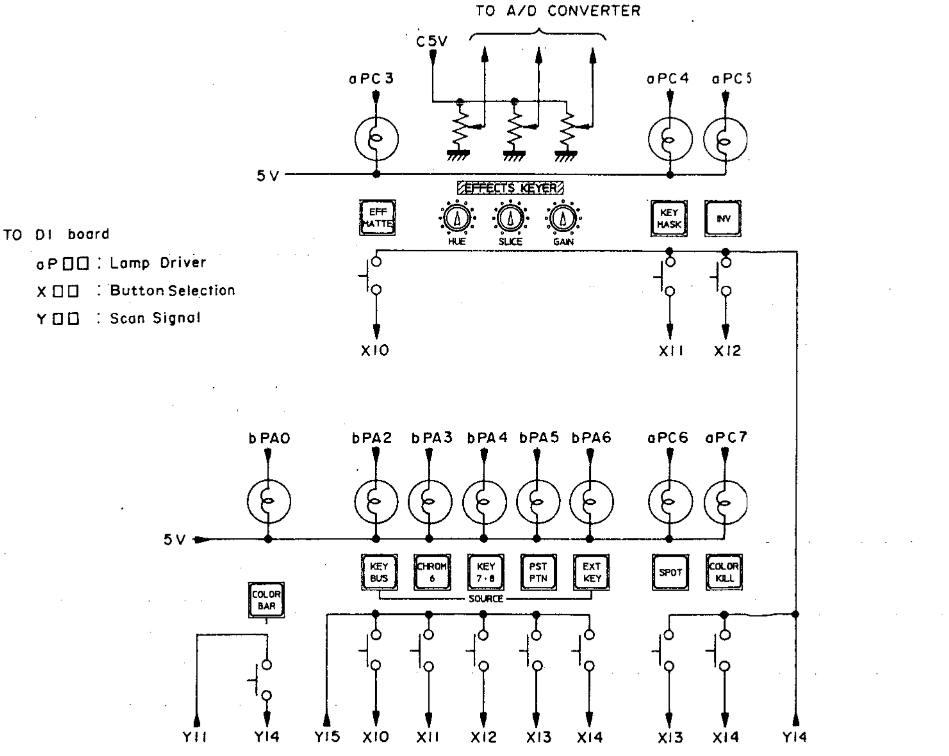
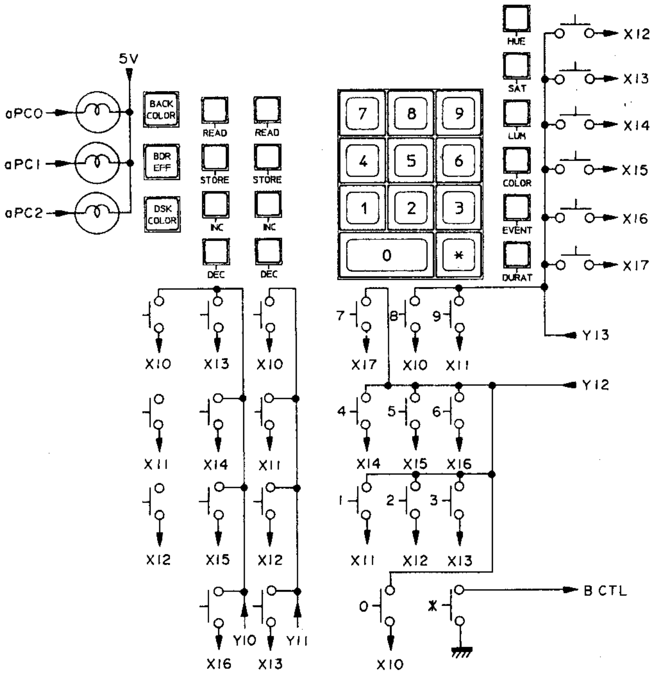

TO A/D CONVERTER
C5V
aPC3
aPC4
aPC5
5V
EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY MASK
INV
TO DI board
aP□□ : Lamp Driver
X□□ : Button Selection
Y□□ : Scan Signal
XI0
XI1
XI2
bPA0
bPA2
bPA3
bPA4
bPA5
bPA6
aPC6
aPC7
5V
COLOR BAR
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
YI1
YI4
YI5
XI0
XI1
XI2
XI3
XI4
XI3
XI4
YI4

Fig. 1-3

1.2.2 COLOR MATTE/MEMORY/DATA ENTRY

The scanning signals (scan signal) to be fed to each button, select signals (button selection) generated by each button, and lamp drive signal (lamp driver) are shown in Fig. 1-4.

The button on/off state is detected by the key matrix circuit as with other switches; however, the * button is an exception. The BCTL signal generated by pressing the * button is directly input to the key matrix circuit and used as a strobe signal.



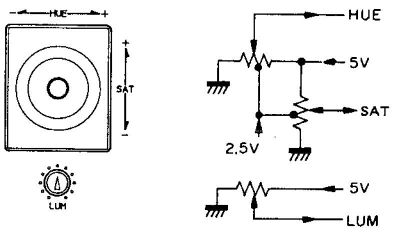
5V
oPC0
oPC1
oPC2
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
HUE
SAT
LUM
COLOR
EVENT
DURAT
7
8
9
4
5
6
1
2
3
0
*
X12
X13
X14
X15
X16
X17
Y13
Y12
X10
X11
X14
X15
X16
Y10
Y11
B CTL

Fig. 1-4

1.2.3 Joystick and LUM control

The position of the joystick and LUM control is sent to the DI circuit board as a DC voltage value with a level of 0 V to 5 V; it is encoded as a digital signal before being input to the CPU as data.

The center position of the joystick maintains constant data at all times by supplying regulated 2.5 V power.



HUE
SAT
LUM
HUE
5V
SAT
2.5V
5V
LUM

Fig. 1-5

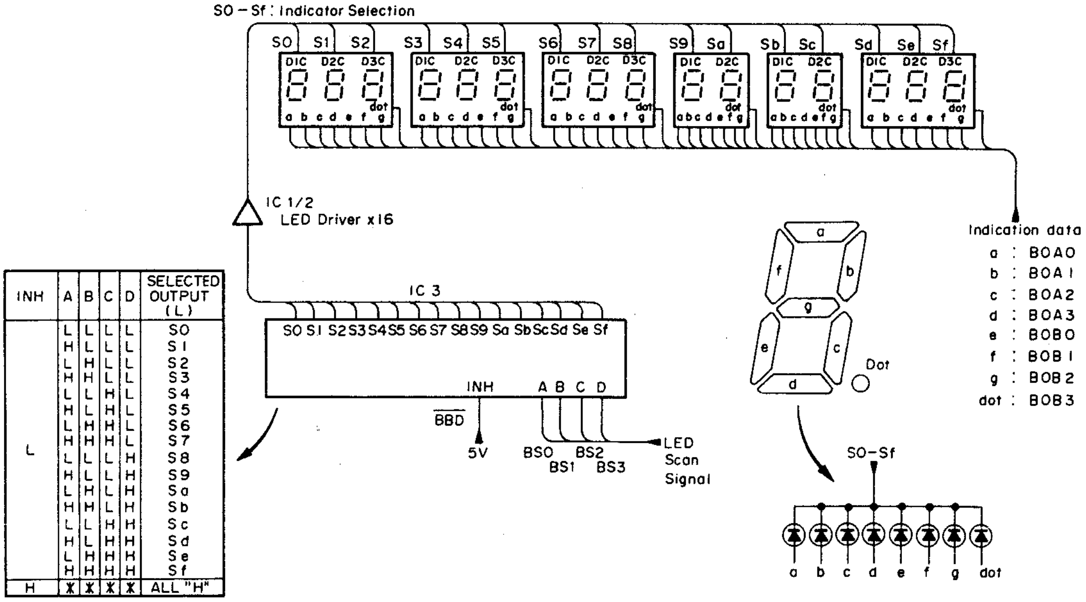
1.2.4 Display

The display is composed of 16 7-segment LEDs in 6 groups.

The number indicated by each 7-segment LED is formed by lighting 8 LED elements using indication data. Although the data to be displayed is given to each 7-segment LED in common, only the LEDs selected by select signals S0 to Sf are lit.

The select signals are obtained by decoding LED scanning signals BS0 to BS3 from the DI circuit board using IC3 and go low in the order S0 to Sf.

As the data to be indicated is switched synchronized to the select signal, the 7-segment LEDs repeat indications from the left in sequence.



S0 – Sf : Indicator Selection
S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 Sa Sb Sc Sd Se Sf
D1C D2C D3C
dot
a b c d e f g
IC 1/2
LED Driver x16
IC 3
S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 Sa Sb Sc Sd Se Sf
INH
A B C D
BBD
5V
BS0 BS2
BS1 BS3
LED Scan Signal
Indication data
a : B0A0
b : B0A1
c : B0A2
d : B0A3
e : B0B0
f : B0B1
g : B0B2
dot : B0B3
a
b
c
d
e
f
g
Dot
S0–Sf
a b c d e f g dot

INH	A	B	C	D	SELECTED OUTPUT (L)
L	L	L	L	L	S0
	H	L	L	L	S1
	L	H	L	L	S2
	H	H	L	L	S3
	L	L	H	L	S4
	H	L	H	L	S5
	L	H	H	L	S6
	H	H	H	L	S7
	L	L	L	H	S8
	H	L	L	H	S9
	L	H	L	H	Sa
	H	H	L	H	Sb
	L	L	H	H	Sc
	H	L	H	H	Sd
	L	H	H	H	Se
	H	H	H	H	Sf
H	*	*	*	*	ALL "H"

Fig. 1-6

1.3 WI (Wipe Indicator) CIRCUIT BOARD/FC (Function) CIRCUIT BOARD AND TK (Auto Take) CIRCUIT BOARD

The buttons and knobs on the right half of the control panel are on these circuit boards. The on/off state of buttons is sent to the DI circuit board and the data from the DI circuit board is used to light the lamps in the buttons.

1.3.1 Wipe pattern section (WI/FC circuit boards)

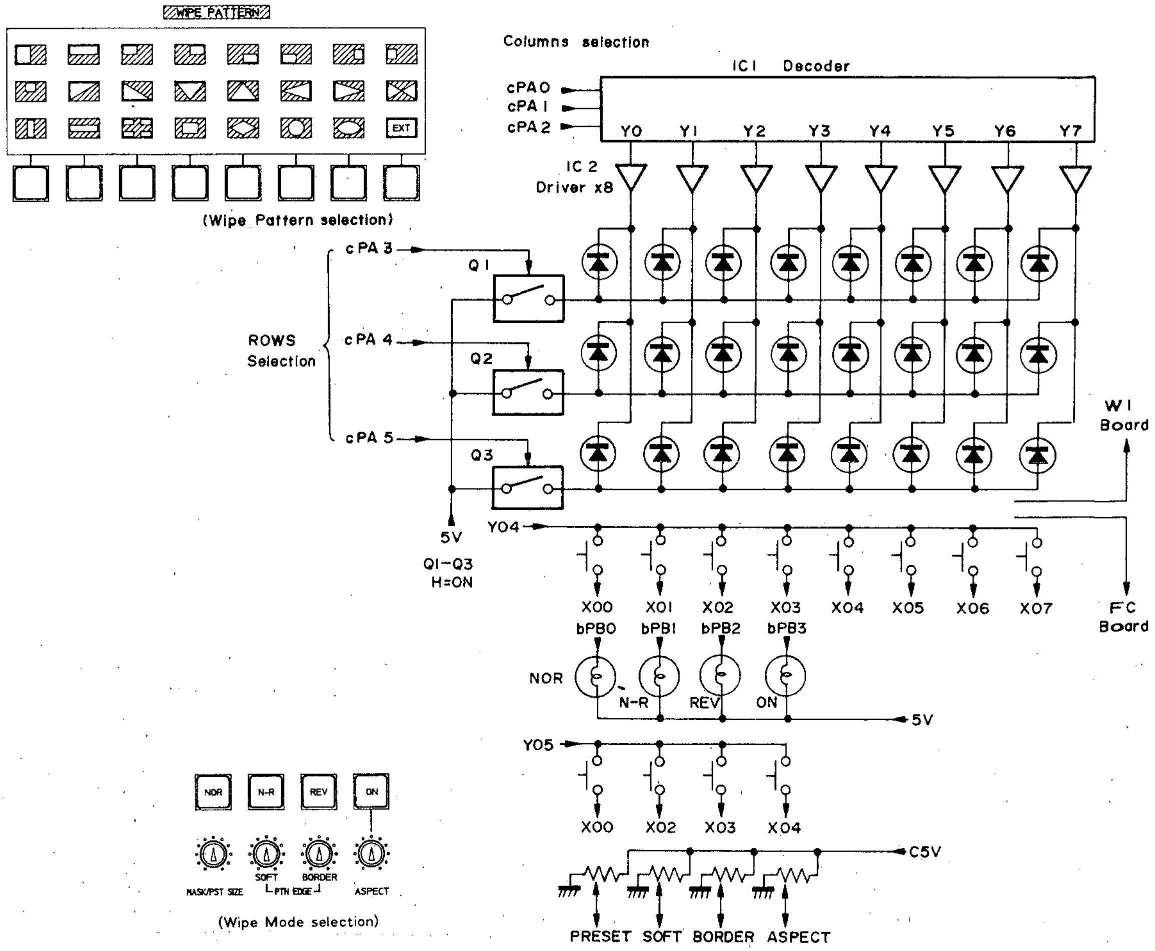

WIPE PATTERN
EXT
(Wipe Pattern selection)
Columns selection
IC1 Decoder
cPA0
cPA1
cPA2
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
IC 2
Driver x8
cPA 3
cPA 4
cPA 5
ROWS
Selection
Q1
Q2
Q3
5V
Q1–Q3
H=ON
WI
Board
Y04
X00
X01
X02
X03
X04
X05
X06
X07
FC
Board
bPB0
bPB1
bPB2
bPB3
NOR
N-R
REV
ON
5V
Y05
X00
X02
X03
X04
C5V
PRESET
SOFT
BORDER
ASPECT
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
(Wipe Mode selection)

Fig. 1-7

The on/off state of the wipe select buttons is sent to the key matrix circuit using scanning signal Y04 and select signals X00 to X07.
The lighting of the wipe pattern indication lamps is controlled by signals cPA0 to cPA5 from the DI circuit board. Signals cPA0 to cPA2 are decoded by IC1, then make one column out of eight columns. At this time, the LEDs corresponding to the rows selected by cPA3 to cPA5 will come on. Signals cPA0 to cPA5 are controlled by the CPU.

The on/off state of the wipe mode buttons is sent to the key matrix circuit by Y05 and X00 to X04 signals and the lighting of lamps is controlled by signals bPB0 to bPB3.
The settings of knobs is sent to the DI circuit board as a signal with a level of 0 V to 5 V DC where it is digitally coded before being sent to the CPU.The C5V signal used for the detection of knob position is stable power generated by the local regulator on the DI circuit board and is a separate channel from the 5 V power for the lamps.

1.3.2 Positioner (FC circuit board)

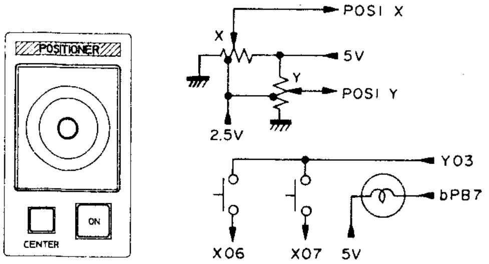
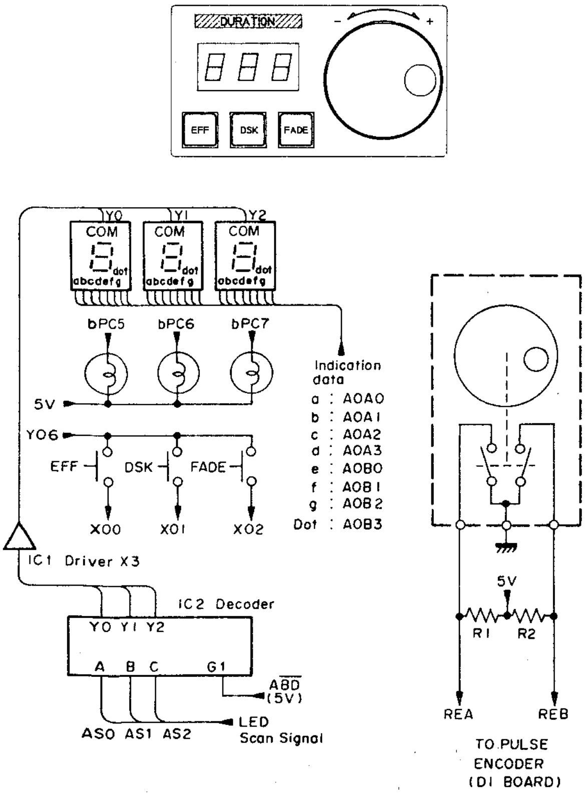

POSITIONER
CENTER
ON
POSI X
X
5V
Y
POSI Y
2.5V
Y03
bPB7
X06
X07
5V

Fig. 1-8

The detected position of the joystick is sent to the DI circuit board as a DC value with a level of 0 to 5 V, which is digitally encoded before being sent to the CPU. The center position of the joystick is constant at all times, at a regulated 2.5 V power.
The on/off detection of buttons is done by Y03, X06 and X07 and the lighting of lamps is done by the bPB7 signal.

1.3.3 DURATION section (FC circuit board)


DURATION
-
+
EFF
DSK
FADE
Y0
Y1
Y2
COM
abcdefg
dot
bPC5
bPC6
bPC7
5V
Y06
EFF
DSK
FADE
X00
X01
X02
Indication data
a : A0A0
b : A0A1
c : A0A2
d : A0A3
e : A0B0
f : A0B1
g : A0B2
Dot : A0B3
IC1 Driver X3
IC2 Decoder
Y0 Y1 Y2
A B C
G1
ABD (5V)
LED Scan Signal
AS0 AS1 AS2
5V
R1
R2
REA
REB
TO PULSE ENCODER (DI BOARD)

G1	A B C	SELECTED OUTPUT (L)
H	L L L	Y0
	H L L	Y1
	L H L	Y2
L	* * *	ALL H

Fig. 1-9

Outputs REA and REB from the rotary encoder are sent to the pulse encoder circuit on the DI circuit board. Outputs from the rotary encoder are shown below.

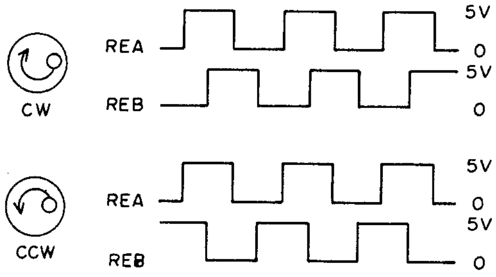


Fig. 1-10

The operation of the display is the same as that of the CM circuit board. The contents of the display are determined by the data to be displayed (indication data). The 7-segment LEDs to be lit are selected by the signals obtained by decoding signals AS0 to AS2 by IC2.
The on/off detection of buttons and lamp lighting are the same as described in other sections.

1.3.4 EFFECTS section (FC/TK circuit boards)

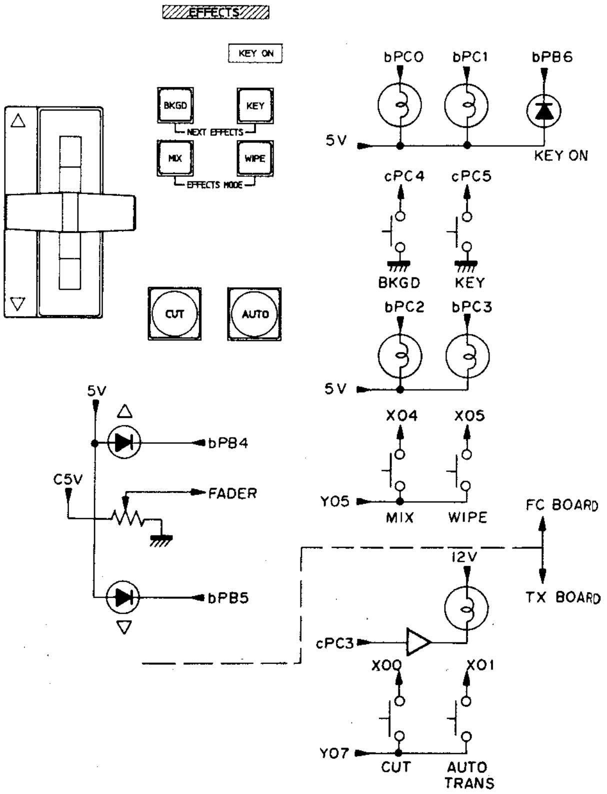

EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
CUT
AUTO
bPC0
bPC1
bPB6
5V
KEY ON
cPC4
cPC5
BKGD
KEY
bPC2
bPC3
5V
X04
X05
Y05
MIX
WIPE
FC BOARD
TX BOARD
12V
cPC3
X00
X01
Y07
CUT
AUTO TRANS
5V
bPB4
C5V
FADER
bPB5

Fig. 1-11

The on/off detection of buttons and lamp lighting are the same as described in other sections except for the BKGD button and KEY button.

The BKGD button and KEY button are not detected by the key matrix circuit. These signals are directly input to the I/O port of the DI circuit board. The position of the fader lever is sent as a DC value with a level of 0 to 5 V to the DI circuit board where it is digitally encoded before being sent to the CPU. When the fader lever is all the way down, signal bPB4 goes low and the LED flagged by the △ marking will come on. When the lever is all the way up, signal bPB5 goes low and the LED flagged by the ▽ marking will come on. All this is controlled by software and executed by the CPU.

1.3.5 DSK section (FC/TK circuit boards)

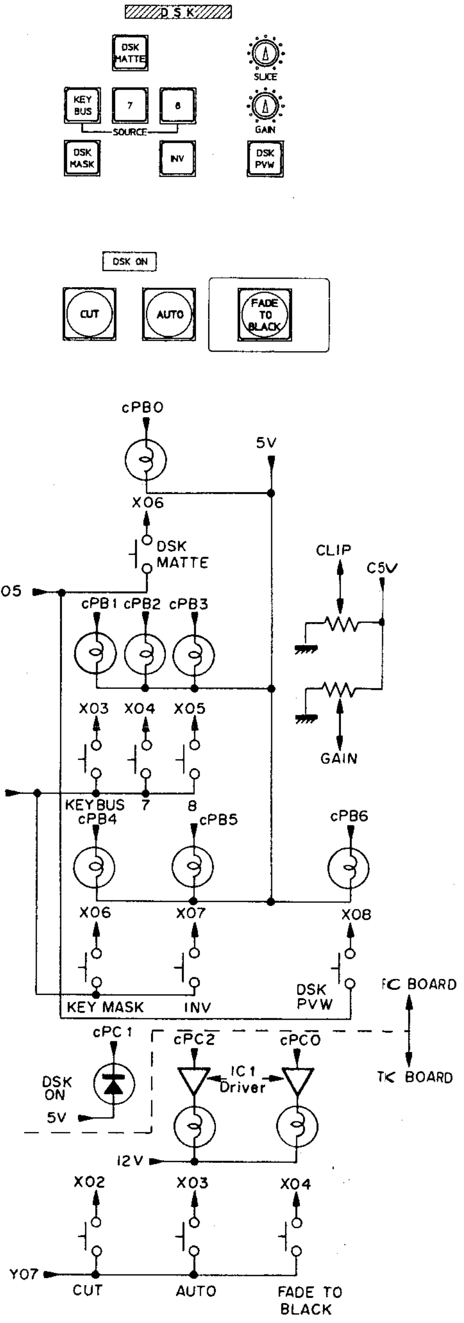

DSK
DSK MATTE
SLICE
KEY BUS
7
8
SOURCE
GAIN
DSK MASK
INV
DSK PVW
DSK ON
CUT
AUTO
FADE TO BLACK
cPB0
5V
X06
DSK MATTE
CLIP
C5V
Y05
cPB1 cPB2 cPB3
X03 X04 X05
GAIN
Y06
KEY BUS 7 8
cPB4
cPB5
cPB6
X06
X07
X08
DSK PVW
FC BOARD
KEY MASK
INV
cPC1
cPC2
cPC0
DSK ON
IC1 Driver
TK BOARD
5V
12V
X02
X03
X04
Y07
CUT
AUTO
FADE TO BLACK

Fig. 1-12

The block diagram is shown above.

As the on/off detection of buttons, lighting of lamps and positional detection of knobs are the same as in other circuits, they are not described here.

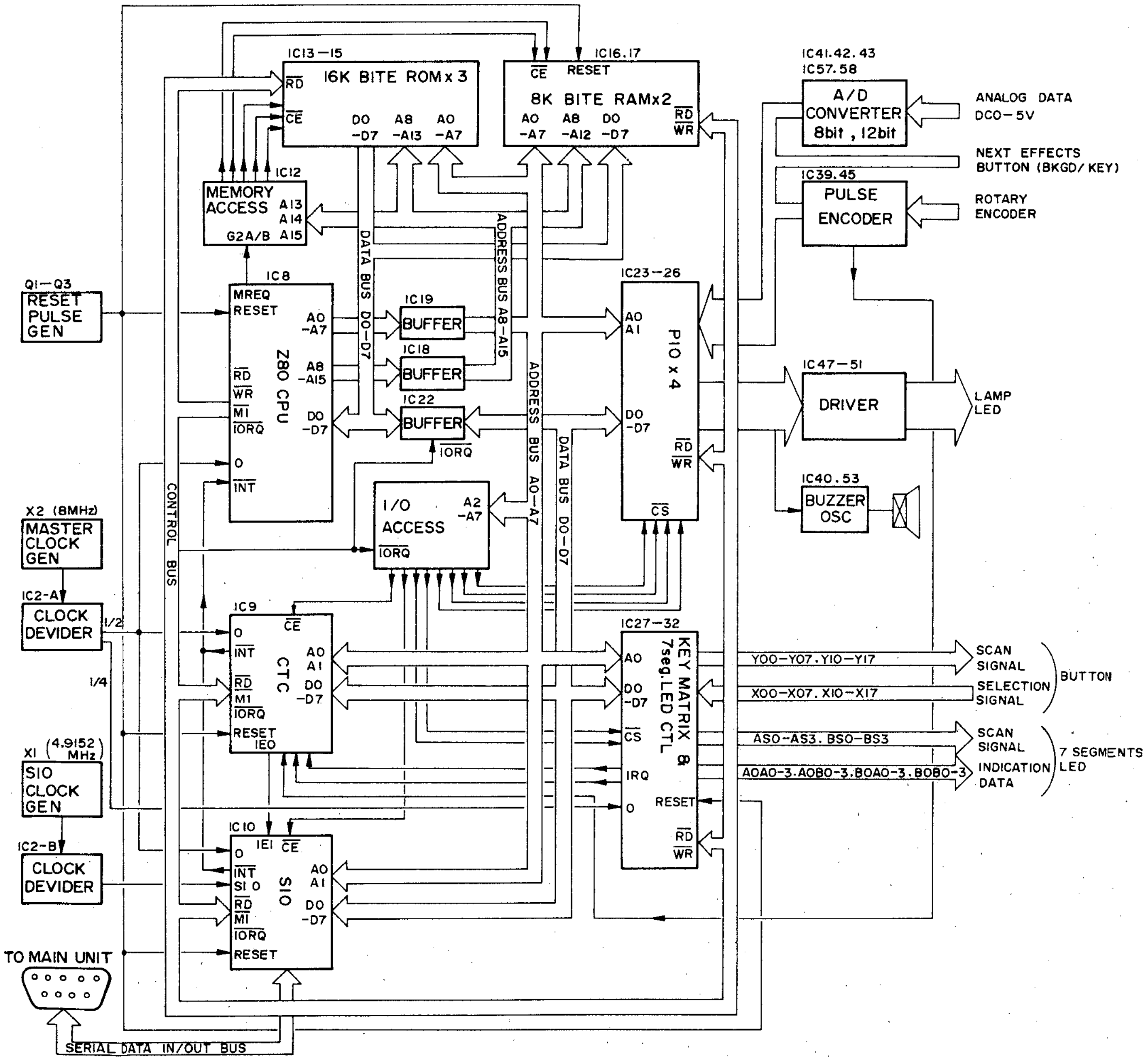

IC13–15
16K BITE ROM x 3
RD
CE
D0 -D7
A8 -A13
A0 -A7
IC16.17
CE
RESET
8K BITE RAMx2
A0 -A7
A8 -A12
D0 -D7
RD
WR
IC41.42.43
IC57.58
A/D CONVERTER 8bit , 12bit
ANALOG DATA
DC0–5V
NEXT EFFECTS
BUTTON (BKGD/ KEY)
IC39.45
PULSE ENCODER
ROTARY ENCODER
IC12
MEMORY ACCESS
A13
A14
A15
G2A/B
DATA BUS D0–D7
ADDRESS BUS A8–A15
Q1–Q3
RESET PULSE GEN
IC8
MREQ
RESET
A0 -A7
A8 -A15
D0 -D7
RD
WR
M1
IORQ
0
INT
Z80 CPU
IC19
BUFFER
IC18
BUFFER
IC22
BUFFER
IORQ
ADDRESS BUS A0–A7
DATA BUS D0–D7
IC23–26
A0
A1
D0 -D7
PIO x 4
RD
WR
CS
IC47–51
DRIVER
LAMP
LED
IC40.53
BUZZER OSC
X2 (8MHz)
MASTER CLOCK GEN
IC2-A
CLOCK DEVIDER
1/2
1/4
CONTROL BUS
I/O ACCESS
A2 -A7
IORQ
IC9
CE
0
INT
RD
M1
IORQ
RESET
IEO
CTC
A0
A1
D0 -D7
IC27–32
A0
D0 -D7
CS
IRQ
0
RESET
RD
WR
KEY MATRIX & 7seg.LED CTL
Y00–Y07.Y10–Y17
X00–X07.X10–X17
AS0–AS3.BS0–BS3
A0A0-3.A0B0-3.B0A0-3.B0B0-3
SCAN SIGNAL
SELECTION SIGNAL
BUTTON
SCAN SIGNAL
INDICATION DATA
7 SEGMENTS LED
X1 (4.9152 MHz)
SIO CLOCK GEN
IC2-B
CLOCK DEVIDER
IC10
IEI
CE
0
INT
SI 0
RD
MI
IORQ
RESET
SIO
A0
A1
D0 -D7
TO MAIN UNIT
SERIAL DATA IN/OUT BUS

Fig. 1-13

1.4 DI (Digital Interface) CIRCUIT BOARD

The DI circuit board is responsible for serial communications between the control unit and main unit, positional detection of buttons and knobs on the control panel, and lighting control of lamps and LEDs.

All this is processed and executed by the CPU using the program contained in a ROM chip.

The block diagram of the DI circuit board is shown in Fig. 1-13.

1.4.1 CPU

The CPU (IC8) uses a Z80 microcomputer chip.

X2 is an 8 MHz frequency oscillator, the output of which is counted down by IC2-A to 4 MHz, which in turn is used as a CPU clock. This clock is used by the CTC and SIO described later.

Q1 to Q3 are a reset circuit for the CPU and the associated IC. This makes the reset terminal of each IC low for a few seconds after power is switched on in order to initialize the ICs. It is also possible to initialize manually using S1.

1.4.2 Memory block

The memory block consists of three 16K Byte ROM chips and two 8K Byte RAM chips.

The 16K Byte ROM chips contain commands for the CPU and the data required for executing these commands. The programmed commands cannot be rewritten.

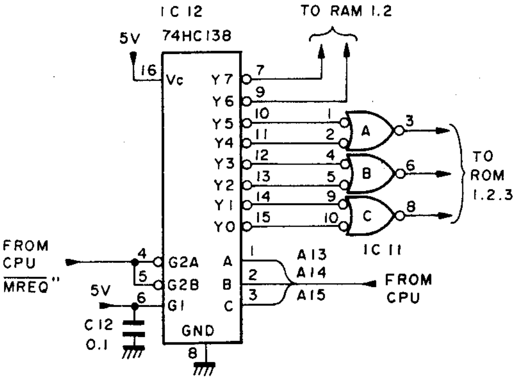


Fig. 1-14

A15	A14	A13	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
L	L	L	L ①	H	H	H	H	H	H	H
L	L	H	H	L	H	H	H	H	H	H
L	H	L	H	H	L ②	H	H	H	H	H
L	H	H	H	H	H	L	H	H	H	H
H	L	L	H	H	H	H	L ③	H	H	H
H	L	H	H	H	H	H	H	L	H	H
H	H	L	H	H	H	H	H	H	L④	H
H	H	H	H	H	H	H	H	H	H	L⑤

Table 1-2

The 8K Byte RAM chips are used to store control panel information and information from the main unit. However, the color matte data generated by the control panel is stored in the memory on the CPU circuit board of the main unit.

Each memory is called up by the memory access circuit. IC12 and IC11-A to C form the memory access circuit.

When the CPU is not calling up memory, $\overline{MREQ}$ = "H" and access outputs Y0 to Y7 all go high and all memory chips enter the standby mode. When the CPU calls up memory, $\overline{MREQ}$ goes low and a single memory is selected by the combination of SELECT inputs A, B and C.

The upper 3 bits (A13, 14 and 15) of the address bus are supplied to SELECT inputs A, B, and C.

1.4.3 Buffer

The address data from the CPU is sent to each associated IC via bus buffers IC18 and IC19.

The lower 8 bits (A0 to A7) of the address bus are common to the memory space and I/O space for ROM, RAM, PIO, CTC, etc. The upper 8 bits (A8 to A15) of the address bus will be sent to the memory block.

Data bus D0 to D7 are directly connected to the memory (RAM/ROM) whereas they are connected to the PIO, CTC, SIO and KEY MATRIX via buffer IC22.

IC22 is a bidirectional buffer whose direction is switched by $\overline{RD}$, $\overline{M1}$ and $\overline{IORQ}$ signals.

When the CPU receives a command code from the memory and exchanges data with the memory, $\overline{IORQ}$ goes high and IC22 is switched to the output direction (─▷─) at all times. (However, the data has no influence over the I/O space but is used only for the memory.)

When the CPU exchanges data with the PIO in the I/O space, $\overline{IORQ}$ goes low and $\overline{M1}$ goes high and IC22 is switched to the input direction (─◁─) if $\overline{RD}$ is low (read) and to the output direction (─▷─) if it is high (write). (At this time, the data is used

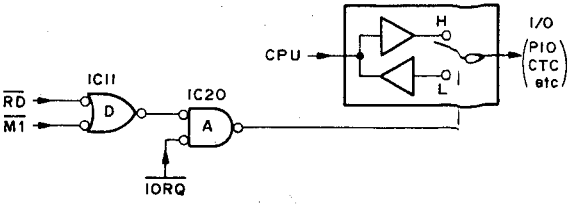


Fig. 1-15

for the I/O space (PIO) and is not input to the memory).

When the CPU receives an interrupt request from the CTC, SIO, or KEY MATRIX, both $\overline{\text{M1}}$ and $\overline{\text{IORQ}}$ go low with the result that the direction will be input (←◁←). At this time, the interrupt vector from the block which requested the interrupt will appear on the data bus. The CPU reads this and performs interrupt processing.

(Interrupt vector: Address in which the program start address for interrupt processing is stored)

1.4.4 I/O access (I/O accessor)

The I/O access circuit selects either one of the I/O spaces including PIO, CTC, SIO, KEY MATRIX, etc.

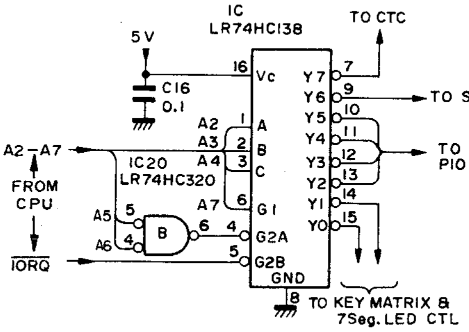


Fig. 1-16

Inputs						Outputs							
Enable			Select										
G_1	G_{2A}	G_{2B}	C	B	A	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
×	×	H	×	×	×	H	H	H	H	H	H	H	H
×	H	×	×	×	×	H	H	H	H	H	H	H	H
L	×	×	×	×	×	H	H	H	H	H	H	H	H
H	L	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	L	H	H	H	H	H	L	H	H	H	H
H	L	L	H	L	L	H	H	H	H	L	H	H	H
H	L	L	H	L	H	H	H	H	H	H	L	H	H
H	L	L	H	H	L	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L

L: selected output.
H: not selected.

Table 1-3

While the CPU is exchanging data with the memory, $\overline{\text{IORQ}}$ goes high and all I/O spaces are inhibited and detached from the CPU. When the CPU exchanges data with an I/O space, $\overline{\text{IORQ}}$ goes low, and the I/O space with which the exchange is to take place will be selected using address buses A2, A3 and A4.

1.4.5 PIO (Parallel Input/Output Controller)

The PIO is in charge of input/output of 8-bit parallel data between an external unit and the CPU.

IC23 to IC26 comprise the PIO. Each IC has three 8-bit parallel ports. The I/O port is selected by the logic bits input to port select inputs A0 and A1. Whether it is input or output is selected by the logic bits input to RD or WR. The PIO has four LSIs, a to d, one of which is selected by the I/O access circuit described in the previous chapter.

A_1	A_0	$\overline{\text{RD}}$	$\overline{\text{WR}}$	$\overline{\text{CS}}$	PERFORMANCE	
0	0	0	1	0	PORT A → DATA BUS	IN (READ)
0	1	0	1	0	PORT B → DATA BUS	
1	0	0	1	0	PORT C → DATA BUS	
0	0	1	0	0	DATA BUS → PORT A	OUT (WRITE)
0	1	1	0	0	DATA BUS → PORT B	
1	0	1	0	0	DATA BUS → PORT C	
1	1	1	0	0	DATA BUS → PIO CONTROL	
1	1	0	1	0	INHIBIT	
X	X	X	X	1	DATA BUS : HIGH IMPEDANCE	
X	X	1	1	0		

FROM I/O ACCESSOR
FROM CPU
A_0 } CPU ADDRESS BUS
A_1

Table 1-4

The I/O signal at each port is shown in the table 1-5.

IC	PORT No.	IN/ OUT	CON- NECTED PCB	SIGNAL NAME
IC26 (a)	a PA 0	OUT	CPS	KEY BUS LAMP SELECTION
	1			
	2			
	3			
	4			KEY BUS LAMP DIMMER
	5			PGM BUS LAMP DIMMER
	6			PRESET BUS LAMP DIMMER
	7		–	UNUSED
	a PB 0	OUT	CPS	PGM BUS LAMP SELECTION
	1			
	2			
	3			
	4			PRESET BUS LAMP SELECTION
	5			
	6			
	7			
	a PC 0	OUT	CM	"BACK COLOR" LAMP DRIVER
	1			"BDR EFF" LAMP DRIVER
	2			"DSK COLOR" LAMP DRIVER
	3			"EFF MATTE" LAMP DRIVER
	4			"KEY MASK" LAMP DRIVER
	5			"INV" LAMP DRIVER
	6			"SPOT" LAMP DRIVER
	7			"COLOR KILL" LAMP DRIVER
IC25 (b)	b PA 0	OUT	CM	"COLOR BAR" LAMP DRIVER
	1			"EDITOR ENABLE" LED DRIVER
	2			"KEY BUS" LAMP DRIVER
	3			"CHROM 6" LAMP DRIVER
	4			"KEY 7,8" LAMP DRIVER
	5			"PST PTN" LAMP DRIVER
	6			"EXT KEY" LAMP DRIVER
	7		–	UNUSED
	b PB 0	OUT	FC	"NOR" LAMP DRIVER
	1			"N-R" LAMP DRIVER
	2			"REV" LAMP DRIVER
	3			"ON" LAMP DRIVER
	4			FADER "△" LAMP DRIVER
	5			FADER "▽" LAMP DRIVER
	6			"KEY ON" LED DRIVER
	7			POSITIONER "ON" LAMP DRIVER
	b PC 0	OUT	FC	"BKGD" LAMP DRIVER
	1			"KEY" LAMP DRIVER
	2			"MIX" LAMP DRIVER
	3			"WIPE" LAMP DRIVER
	4		–	UNUSED
	5		FC	DURATION "EFF" LAMP DRIVER
	6			DURATION "DSK" LAMP DRIVER
	7			DURATION "FADE" LAMP DRIVER

IC	PORT No.	IN/ OUT	CON- NECTED PCB	SIGNAL NAME
IC24 (c)	c PA 0	OUT	WI	"WIPE PATTERN" LAMP COLUMNS SELECTION
	1			
	2			
	3			
	4			"WIPE PATTERN" LAMP ROWS SELECTION
	5			
	6		–	UNUSED
	7		DI	BUZZER TRIGGER
	c PB 0	OUT	FC	"DSK MATTE" LAMP DRIVER
	1			"KEY BUS" LAMP DRIVER
	2			"7" LAMP DRIVER
	3			"8" LAMP DRIVER
	4			"KEY MASK" LAMP DRIVER
	5			"INV" LAMP DRIVER
	6			"DSK PVW" LAMP DRIVER
	7		–	UNUSED
	c PC 0	OUT	TK	"FADE TO BLACK" LAMP DRIVER
	1			"DSK ON" LED DRIVER
	2			DSK "AUTO" LAMP DRIVER
	3			EFFECTS "AUTO" LAMP DRIVER
	4	IN	FC	"BKGD" BUTTON ON-OFF
	5			"KEY" BUTTON ON-OFF
	6		–	UNUSED
	7			
IC23 (d)	d PA 0	IN	DI	LSB OF 8-BIT
	1			
	2			
	3			A/D CONVERTED DATA (8-bit/12-bit)
	4			
	5			
	6			
	7			MSB
	d PB 0	IN	DI	FADER LIMIT L
	1			FADER LIMIT H
	2			ROTARY ENCODER DIRECTION
	3			CONVERSION STOP
	4			LSB OF 12-BIT
	5			A/D CONVERTED DATA (12-bit)
	6			
	7			
	d PC 0	OUT	DI	A/D CONVERTER PARAMETER SELECTION
	1			
	2			
	3			
	4			UNUSED
	5			
	6			
	7			CONVERSION START

Table 1-5

1.4.6 CTC (Counter and Timer Circuit)

The CTC has four independent programmable counter and timer circuit channels.

In the KM-3000, the four channels are classified as follows.

Channel 0:	Not used
Channel 1:	Receives interrupt signals from key matrix (1).
Channel 2:	Receives interrupt signals from the pulse encoder.
Channel 3:	Receives interrupt signals from key matrix (2).

In this way, the CTC does not serve as a timer or counter but as a receiver for interrupt signals. The priority in interrupt is given to channel 0, with channel 3 having the lowest priority.

Upon receipt of an interrupt, the CTC makes the INT terminal low and requests an interrupt to the CPU.

The IEO terminal is connected to the IEI terminal of the SIO to be described later. While the CTC is accepting an interrupt, the SIO inhibits other interrupts.

1.4.7 SIO (Serial Input/Output Interface)

The SIO converts serial data from the KM-3000 or editor into parallel data before sending it to the CPU. Conversely, the SIO converts parallel data from the CPU into serial data before sending it to the KM-3000 main unit.

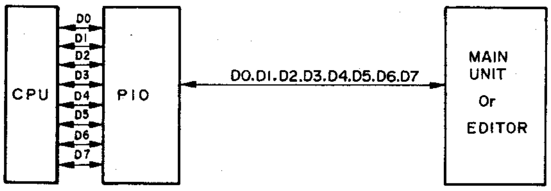


Fig. 1-17

Inside the SIO, there are two mutually independent channels, each of which is capable of reception and transmission. Channel A performs transmission/reception to and from the CPU in the KM-3000 main unit and channel B performs transmission/ reception to and from the CPU in the editor. The channel is switched by address A1 from the CPU to be input to the B/$\overline{A}$ terminal.

In the SIO, there are data and command registers. Depending on whether it is data or a command to be written to or read from the SIO, it is necessary to switch registers. The registers are switched by address A0 which is input to the C/$\overline{D}$ terminal from the CPU.

The relation between A1, A0, channel and register is shown below.

A_1 (B/$\overline{A}$)	A_0 (C/$\overline{D}$)	CHANNEL	REGISTER
L	L	A (Main unit)	DATA
L	H		COMMAND
H	L	B (Editor)	DATA
H	H		COMMAND

Table 1-6

The reception terminal for serial data is RXDA (RXDB) and the transmission terminal is TXDA (TXDB) and the communication method is asynchronous.

Data transmission can comply with either RS-232 or RS-422.

The switching between RS-232 and RS-422 is done by reinserting connectors on the DI circuit board.

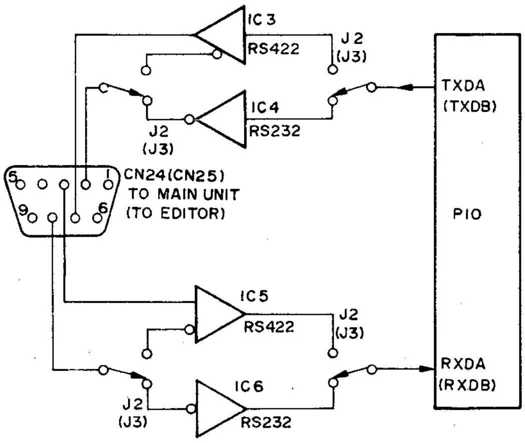


Fig. 1-18

Either 38.4K bauds, 19.2K bauds, 9600 baud or 4800 baud can be selected as the transmission speed of the reception and transmission clock. The transmission speed should be the same as that of the main unit.

(1 baud = 1 bit per second)

X1 is a reception and transmission clock oscillator. The oscillation output is counted down by IC2, then the transmission speed is selected by J1.

1.4.8 Key matrix circuit and 7-segment LED display circuit

The key matrix circuit detects the on/off state of the buttons on the control panel and sends information to the CPU. The 7-segment LED display circuit displays the 7-segment LEDs using data from the CPU.

(1) Key matrix circuit

The information for all buttons on the control panel excepting three buttons -- the "BKGD" button and the "KEY" button in the EFFECTS section, and the "*" button in the ten-key pad section is input to the key matrix circuit.

The key matrix circuit consists of two button areas composed of 8 columns x 8 rows and two controller ICs which scan and detect respective areas.

The button array in each button space are each connected to the FC, TK, WI, CM and CPS circuit boards. The button array is as shown in Fig. 1-19.

S2 S1 S0	Y00 Y10	Y01 Y11	Y02 Y12	Y03 Y13	Y04 Y14	Y05 Y15	Y06 Y16	Y07 Y17
L L L	L	H	H	H	H	H	H	H
L L H	H	L	H	H	H	H	H	H
L H L	H	H	L	H	H	H	H	H
L H H	H	H	H	L	H	H	H	H
H L L	H	H	H	H	L	H	H	H
H L H	H	H	H	H	H	L	H	H
H H L	H	H	H	H	H	H	L	H
H H H	H	H	H	H	H	H	H	L

L = selected out

Table 1-7

The block diagram is shown in Fig. 1-20.

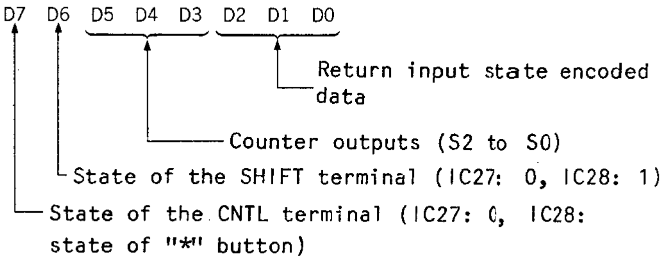
IC27 (IC28) is a controller IC which scans and detects button settings.

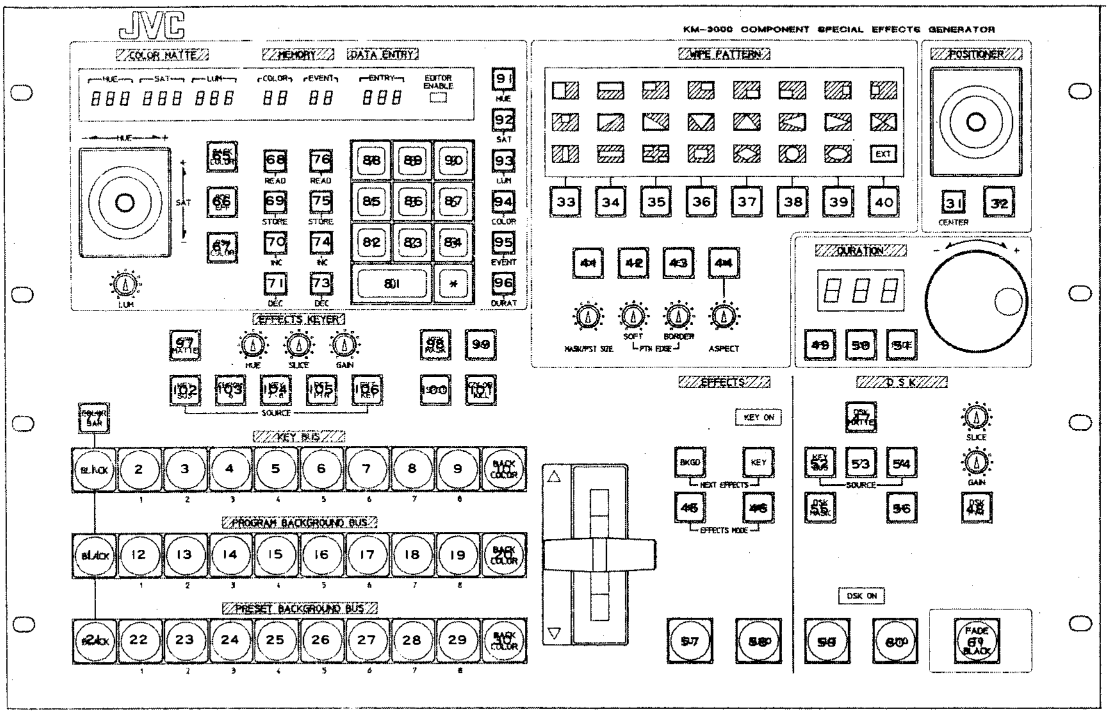
S0 to S2 are counter outputs generated by clock; these are decoded by IC29 (IC30) and scanning signals Y00 (Y10) to Y07 (Y17) are obtained.

Y00 (Y10) to Y07 (Y17) go low in sequence, synchronized to clock, and sequentially scan each row of the above button areas. The scanned results X00 (X01) to X07 (X17) are input to return inputs RL0 to RL7.

If none of the buttons is pressed, as the return inputs are pulled up within the IC, they are all "1" (high). If a button is pressed in the row scanned, the return input corresponding to the row becomes "0" (low), and this is detected within the controller IC. At the same time, the interrupt is requested to the CPU via the CTC described earlier. (The "INT" terminal goes high.)

At this time, the data bus will be as follows.


D7 D6 D5 D4 D3 D2 D1 D0
Return input state encoded data
Counter outputs (S2 to S0)
State of the SHIFT terminal (IC27: 0, IC28: 1)
State of the CNTL terminal (IC27: 0, IC28: state of "*" button)


JVC
KM-3000 COMPONENT SPECIAL EFFECTS GENERATOR
COLOR MATTE
MEMORY
DATA ENTRY
WIPE PATTERN
POSITIONER
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
READ
STORE
INC
DEC
DURAT
CENTER
DURATION
EFFECTS KEYER
SLICE
GAIN
SOURCE
KEY BUS
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
BLACK
BACK COLOR
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
EXT
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
EFFECTS MODE
D S K
DSK ON
FADE TO BLACK

X07	8	16	24	32	40	48	56	
X06	7	15	23	31	39	47	55	
X05	6	14	22	30	38	46	54	
X04	5	13	21	29	37	45	53	61
X03	4	12	20	28	36	44	52	60
X02	3	11	19	27	35	43	51	59
X01	2	10	18	26	34	42	50	58
X00	1	9	17	25	33	41	49	57
	Y00	Y01	Y02	Y03	Y04	Y05	Y06	Y07

Button space 1

X17			88	96	104			
X16	71		87	95	103			
X15	70		86	94	102			
X14	69	77	85	93	101			
X13	68	76	84	92	100			
X12	67	75	83	91	99			
X11	66	74	82	90	98	106		
X10	65	73	81	89	97	105		
	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17

Button space 2

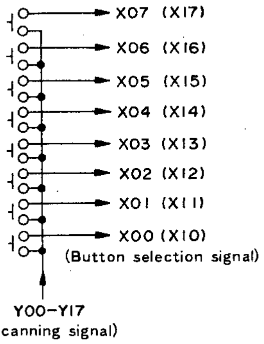

X07 (X17)
X06 (X16)
X05 (X15)
X04 (X14)
X03 (X13)
X02 (X12)
X01 (X11)
X00 (X10)
(Button selection signal)
Y00–Y17
(Scanning signal)

Fig. 1-19 Button space

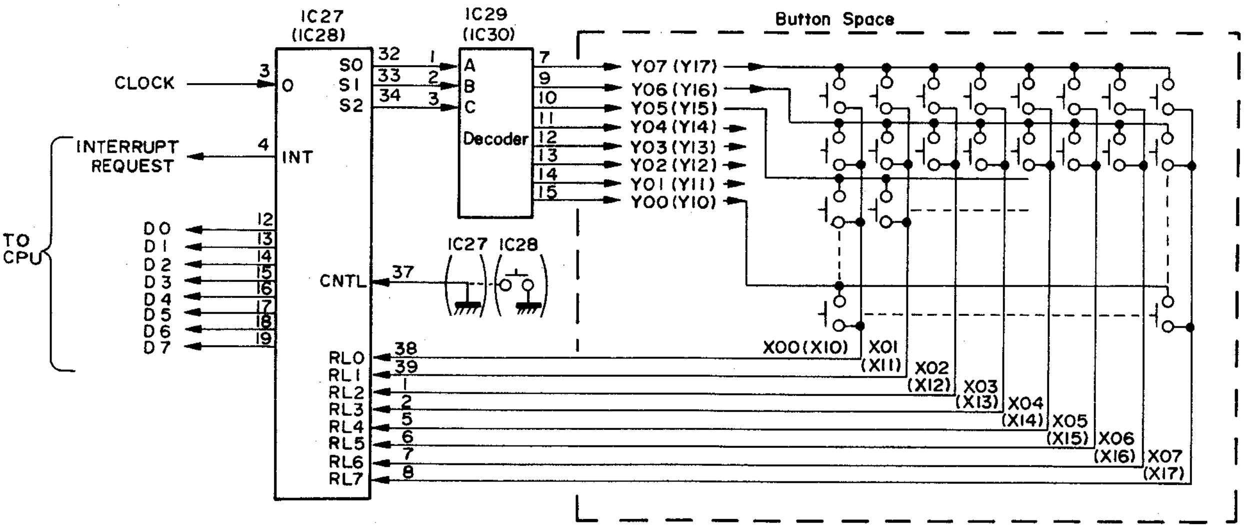

IC27
(IC28)
IC29
(IC30)
Button Space
CLOCK
3
O
INTERRUPT REQUEST
4
INT
TO CPU
D0
D1
D2
D3
D4
D5
D6
D7
12
13
14
15
16
17
18
19
S0
S1
S2
32
33
34
1
2
3
A
B
C
Decoder
7
9
10
11
12
13
14
15
Y07 (Y17)
Y06 (Y16)
Y05 (Y15)
Y04 (Y14)
Y03 (Y13)
Y02 (Y12)
Y01 (Y11)
Y00 (Y10)
CNTL
37
IC27 IC28
RL0
RL1
RL2
RL3
RL4
RL5
RL6
RL7
38
39
1
2
5
6
7
8
X00 (X10)
X01 (X11)
X02 (X12)
X03 (X13)
X04 (X14)
X05 (X15)
X06 (X16)
X07 (X17)

Fig. 1-20

If more than one button is pressed simultaneously, the data for the button scanned first appears on the data bus.

The CNTL terminal is connected to the "*" button of the ten-key pad section on the panel. If this button is pressed together with either of buttons 0 to 4 on the ten-key pad, the CPU executes special software processing.

Upon receipt of the interrupt signal, the CPU reads the data on data bus D0 to D7, then performs the necessary processing.

For example, when the "BACK COLOR" (⑩ in Fig. 1-9) KEY BUS select button is pressed, and Y01'th row is scanned, the return input and data bus will be as shown below.

(RL7, RL6, RL5, RL4, RL3, RL2, RL1, and RL0)
=(0 0 0 0 0 0 1 0)

(D7, D6, D5, D4, D3, D2 D1, and D0)
=(0 0 0 0 1 0 0 1)

The CPU receives this data and performs the following processing.

① Data is sent to the main unit via the SIO and the "BACK COLOR" signal is output to the KEY BUS.

② Data is sent to the PIO and the lamp in the button is lit using the key bus lamp select signals (aPA0 to aPA3).

(2) 7-segment LED display circuit

The 7-segment LED display circuit uses the key matrix circuit control ICs in common.

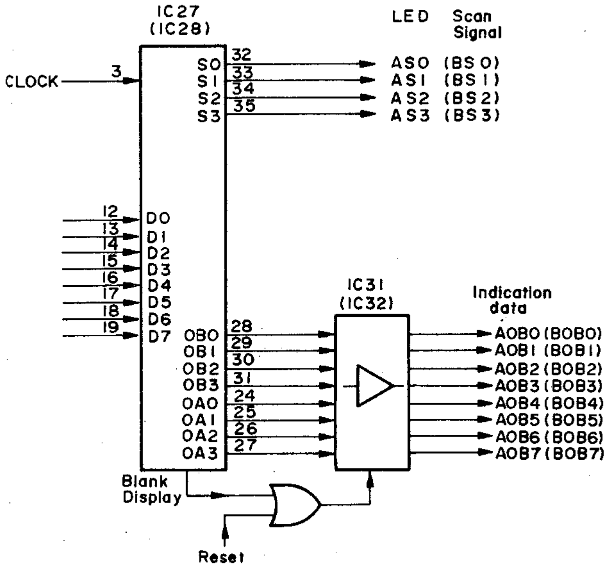

IC27
(IC28)
LED Scan Signal
CLOCK
3
S0
S1
S2
S3
32
33
34
35
AS0 (BS0)
AS1 (BS1)
AS2 (BS2)
AS3 (BS3)
12
13
14
15
16
17
18
19
D0
D1
D2
D3
D4
D5
D6
D7
OB0
OB1
OB2
OB3
OA0
OA1
OA2
OA3
28
29
30
31
24
25
26
27
IC31
(IC32)
Indication data
AOB0 (BOB0)
AOB1 (BOB1)
AOB2 (BOB2)
AOB3 (BOB3)
AOB4 (BOB4)
AOB5 (BOB5)
AOB6 (BOB6)
AOB7 (BOB7)
Blank Display
Reset

Fig. 1-21

The display data sent from the CPU is written to the display RAM within the controller IC, then input via the register to driver IC31 (IC32) as OB0 to OB3 and OA0 to OA3. This display data (indication data) is input to the display section as described in 1.2.4, lighting the 7-segment LEDs.

The LEDs to be lit are sequentially selected by LED scanning signals AS0 to AS3 (BS0 to BS3). The LED scanning signals are counted up synchronized to the display data.

1.4.9 Pulse encoder circuit

This circuit generates the count pulses for the CTC using the output pulses from the rotary encoder in the DURATION section described in 1.3.3. This circuit also detects the direction of rotation.

IC45-A, B, and C are phase circuits and delay the REA signal. Both the delayed signal and original signal are input to IC45-D (exclusive OR gate) where the positive-going pulse synchronized to the leading edge and trailing edge of the REA signal is generated.

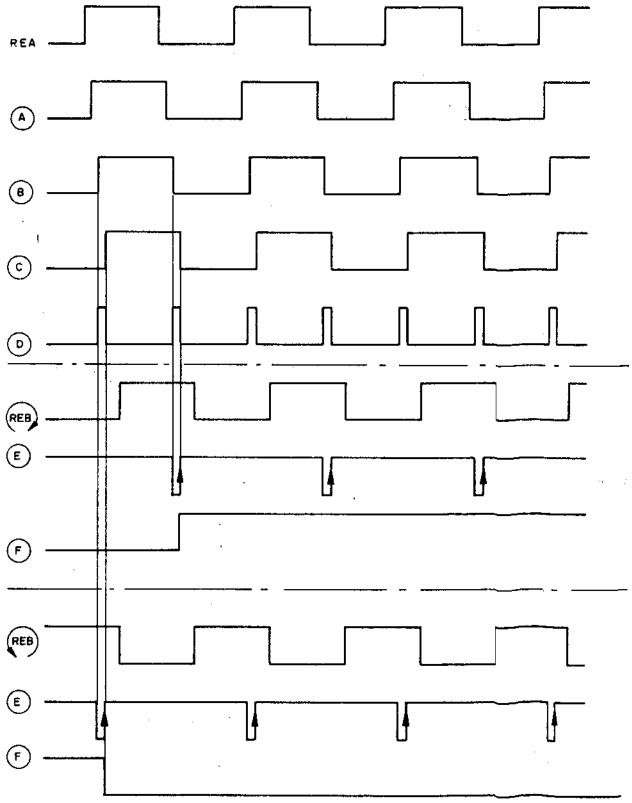


Fig. 1-22

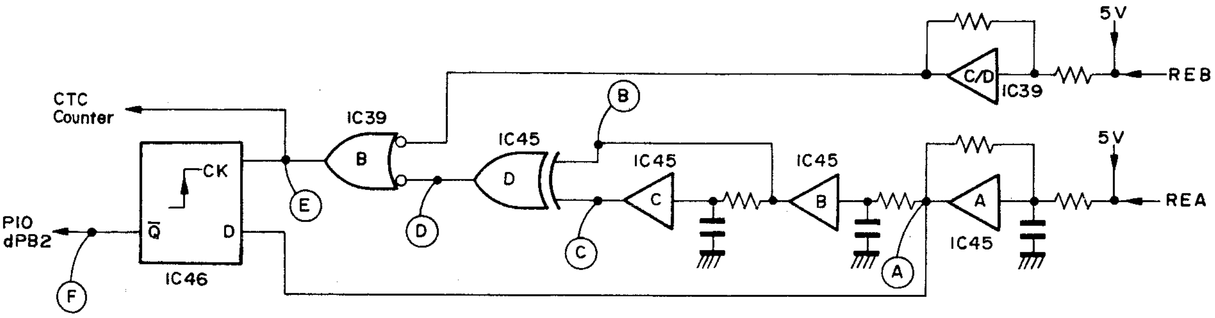


Fig. 1-23

This pulse and the REB signal are input to IC39-B where the count pulse (waveform Ⓔ) is obtained. The count pulse is input to the clock (CK) terminal of IC46 and the CTC counter.

IC46 is a D flip-flop which reads the state of the signal at terminal D (REA signal) and outputs the inverted signal from terminal Q. This output (waveform Ⓕ) goes high when the rotary encoder is rotated clockwise and goes low when it is rotated counterclockwise; it is input to the CPU via terminal dPB2 of the PIO.

Every time a count pulse is input to the CTC, it requests an interrupt to the CPU. At this time, the CPU reads the state of terminal dPB2 of the previous PIO and detects the direction of rotation of the rotary encoder. If the direction of rotation is clockwise, the data of the DURATION time is incremented as a count up pulse. If it is counterclockwise, the data is decremented as a count down pulse.

1.4.10 A/D converter

The A/D converter is of the serial comparator type and has a resolution of 8 bits or 12 bits depending on the parameter to be converted.

Signals dPC0 to dPC3 are parameter select signals and switch analog switches IC57 and IC58. The parameter select signals and parameters are shown in Table 1-8.

The A/D converter converts the settings of the fader lever, joystick (POSITIONER, HUE/SAT) and other knobs (0 to 5 V DC value) on the control panel into 8-bit or 12-bit digital signals before they are sent to the CPU.

(1) Parameter discriminator

Among parameters, the FADER LEVER and MASK/PST SIZE VRs (both flagged by *) are 12-bit data and the rest are 8-bit data.

IC34-A NOR gate is the 8-bit/12-bit parameter discriminator and lower 3 bits of the parameter select signal are its input. The fact that the lower 3 bits are all 0 (low) only when the parameter is 12 bits is employed. The discriminator output is inverted by IC35-B before being input to the conversion stopper.

dPC3	dPC2	dPC1	dPC0	PARAMETER	
L	L	L	L	☆ FADER LEVER	
L	L	L	H	LUM VR	COLOR MATTE
L	L	H	L	JOYSTICK HUE	
L	L	H	H	JOYSTICK SAT	
L	H	L	L	HUE VR	EFFECTS KEYER
L	H	L	H	SLICE VR	
L	H	H	L	GAIN VR	
L	H	H	H	SOFTNESS VR	WIPE PATTERN
H	L	L	L	☆ MASK/PST SIZE VR	
H	L	L	H	BORDER VR	
H	L	H	L	ASPECT VR	
H	L	H	H	POSITIONER X	
H	H	L	L	POSITIONER Y	
H	H	L	H	SLICE VR	DSK
H	H	H	L	GAIN VR	
H	H	H	H	UNUSED	

(☆ = 12-bit data, Others = 8-bit data)

Table 1-8

(2) Clock generator and starter

The loop composed of IC1-E/D is a clock generator and the oscillation frequency is 50K Hz .

The 3-stage flip-flop consisting of IC36-A/B and IC37-A is the starter for A/D conversion. Output dPC7 from the PIO is the trigger for starting and is generated every time each parameter is converted. When the trigger is input, IC36-A resets IC42/43 (data latch ICs) and IC37-A resets IC41 (binary counter) respectively, making each output all low.

The output from IC37-A at the same time makes the NOR gate (IC38-A) active and transmits clock to IC41 and IC42/43. (Refer to Timing Chart in Fig. 1-24.)

(3) Converter block

The converter block consists of IC41 binary counter, IC42/43 data latch, IC44 D/A converter and IC52-A comparator.

As the A/D conversion is of the serial comparator type, it takes more time than the parallel comparator (used in the KM-F250) and the circuit is more complex, but the accuracy is higher. The procedure is described here.

The results of A/D conversion (dPA7 to dPA0, dPB7 to dPB4) are output from IC42/43 (data latch); they are all "0" (low) at the time of starting. The most significant bit is dPA7 and least significant bit is dPA0 for 8 bits and dPB4 for 12 bits.

The conversion is done sequentially one bit at a time. If the conversion operation of 1 bit is called a stage, 8 stage operation is performed for 8 bits and 12 stage operation, for 12 bits.

At the first stage, the MSB is selected. Binary counter IC41 is a bit selector and its output Q1 to Q4 are selected signals.

The next bit is selected in every stage.

. Start stage

The moment conversion starts, the MSB is set to "1" (high). At the same time, this is converted into a DC value with a level of 0 to 5 V using IC44 D/A converter. The converted value is compared with the parameter value by comparator IC 52-A. If the parameter value is equal or higher, the MSB remains "1" and proceeds to the next stage. If the parameter value is smaller, the MSB is reset to "0" then proceeds to the next stage.

. Second to 7th (11th) stage

The 7th bit (11th bit) to first bit are sequentially set to "1" or reset to "0" in a similar manner.

. End stage

The LSB is set to "1" or reset to "0" in a similar way before the EOC (end of conversion) signal is sent to the CPU. The EOC signal is generated by applying the trigger signal to IC37-A using the conversion stopper and is input to the CPU through the dPB2 terminal of the PIO.

Upon receipt of the EOC signal, the CPU reads the results of the data latch output from IC42/43 as a result of A/D conversion.

Upon completion of read, the start trigger signal (dPC7) is generated again and proceeds to the conversion of the next parameter.

In this way, the digitized data is restored to an analog value once, then compared with the parameter value and the data is rewritten so that they are as close as possible to each other. IC38-C NOR gate sets each bit to "1" or resets it to "0". One stage proceeds to the next stage at every two clocks.

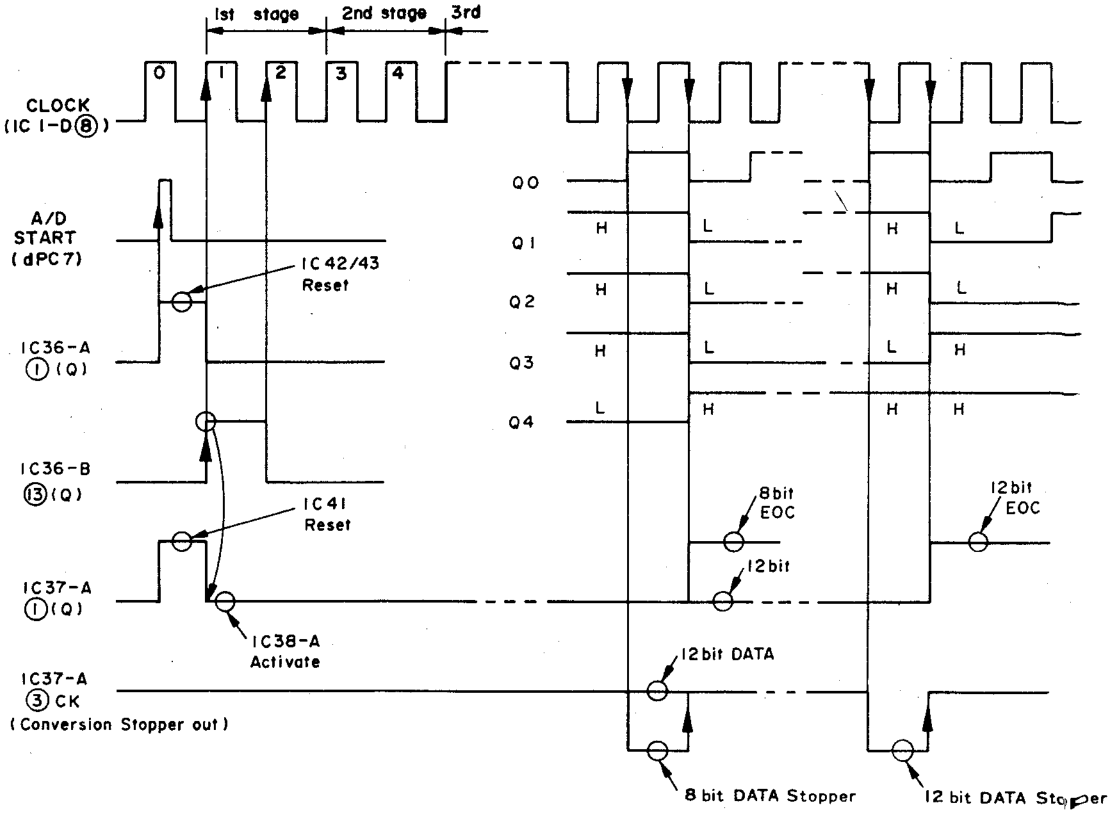


Fig. 1-24

Pin ⑧ of IC38-C goes high without fail at the first clock in one stage, therefore the output goes high, setting bits to "1". However, this pin ⑧ goes low by the second clock and the signal input to pin ⑨ is output. The signal input to pin ⑨ is the comparator output described previously, which determines whether the bits remain set to "1" or reset to "0".

(4) Conversion stopper

The EOC signal described previously is generated in this. The conversion stopper consists of IC34-B, IC39-A, and IC35-A/C/D.

The previously described bit select signals (Q1 to Q4 of IC41) and parameter discriminator outputs (signal at pin ④ of IC35-B) are input to these gate circuits.

As a result, when the parameter is 8 bits and (Q4, Q3, Q2, Q1) shift from (L,H,H,H) to (H,L,L,L), namely, when the stage is changed from the final (8th) stage to the 9th stage, the output of IC34-B changes from high to low, then back to high, and the trigger signal is generated.

This trigger signal is input to IC37-A, the output of which becomes the EOC signal. As mentioned previously, the EOC signal is fetched by the CPU, and at the same time, it closes IC38-C NOR gate to shut off the clock to IC42/43, also resetting the output from the IC41 binary counter so that it is all "0" (low).

When the parameter is 12 bits and (Q4, Q3, Q2, Q1) shift from (H,L,H,H) to (H,H,L,L), namely, when the stage changes from the final (12th) stage to the 13th stage, the EOC signal is generated.

1.4.11 Fader limit detection

The fader limit is detected by the window comparator consisting of IC56-A/B.

When the fader lever is moved fully up and the fader voltage exceeds 4.2 V, IC56-A is switched on and FLH (Fader Limit H, "H") is output. When the fader lever is moved fully down and the fader voltage becomes below 0.8 V, IC56-B is switched on and FLL (Fader Limit L, "H") is output.

The FLH and FLL signals are each fed to the CPU via dPB1 and dPB0 of the PIO.

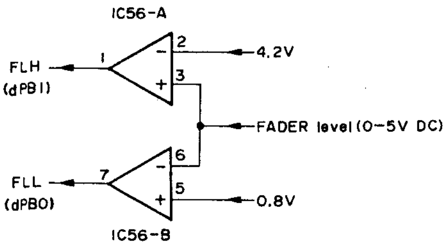


Fig. 1-25

The CPU controls the lamp dimmer signal (refer to 1.1) using the FLL and FLH signals. The FLL and FLH signals produced here are processed within the control unit and in the main unit, independent fader limit signals are generated.

1.4.12 Buzzer oscillator

The signal at the cPA7 terminal of the PIO is a trigger output for the buzzer. Detecting the leading edge of this trigger signal, the buzzer circuit sounds this oscillator momentarily. Using the differentiator circuit consisting of C59, R103 and D3, only the leading edge is detected.

2. MAIN UNIT

The main unit of the KM-3000 includes the following circuit boards.

1. BNC circuit board
2. GPI circuit board
3. RM circuit board
4. MT circuit board
5. CP circuit board
6. WF circuit board
7. KEY circuit board
8. VIDEO circuit board
9. KSG circuit board
10. SG circuit board
11. CPU circuit board

These are explained in this order.

2.1 BNC CIRCUIT BOARD

This board exchanges signals between the BNC terminals on the rear panel and the MT circuit board. The video input signals (Y/R-Y/B-Y 1 - 8 and KEY 7, 8) are terminated with 75Ω on the circuit board.

2.2 GPI (General Purpose Interface) CIRCUIT BOARD

This board outputs the tally signal and accepts GPI input signals.

2.2.1 Tally signal output

When input video signal 1 - 8 selected by its bus select button (PROGRAM, PRESET, KEY) on the control panel is output from the main line, the tally signal with the same number is output.
Contact supply and power supply are selectable in the Tally mode. Normally power is supplied and it becomes 5 V with tally ON and 0 V with tally OFF. Connect the MODE terminal to GND for the contact supply.
Switching the tally lamps ON/OFF is done by control signals TALLY 1 - 8 from the CPU switching relays on and off.

2.2.2 GPI signal input

The GPI (General Purpose Interface) controls certain functions from the external switches or editor. This function is enabled by supplying contact signals from the switches connected to the GPI terminal or external equipment. The contact signals input to the GPI terminal are sent to the CPU and the required processing is performed. The GPI terminal and CPU are isolated by photocoupler IC1/IC2. The output of this photocoupler becomes "L" after supplying a GPI terminal signal and this is converted in IC3, becomes "H" and then is input to the CPU.

2.3 RM (Remote) CIRCUIT BOARD

This circuit board controls data transmission between the control unit, editor and the main unit. Serial data is sent or received via connectors which are independent of the control unit or editor. The connectors can comply with either RS-232C or RS-422 serial communication protocols. Switching between RS-232 and RS-422 is performed by changing connectors on the circuit board. The following diagram shows the circuit supplying signals to the control unit. The DI circuit board in the control unit uses the same circuit.

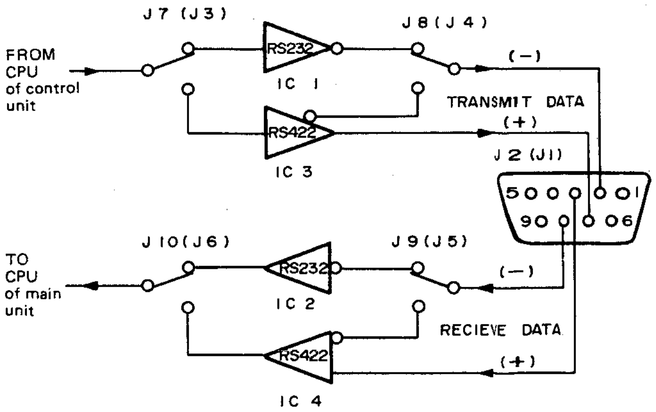
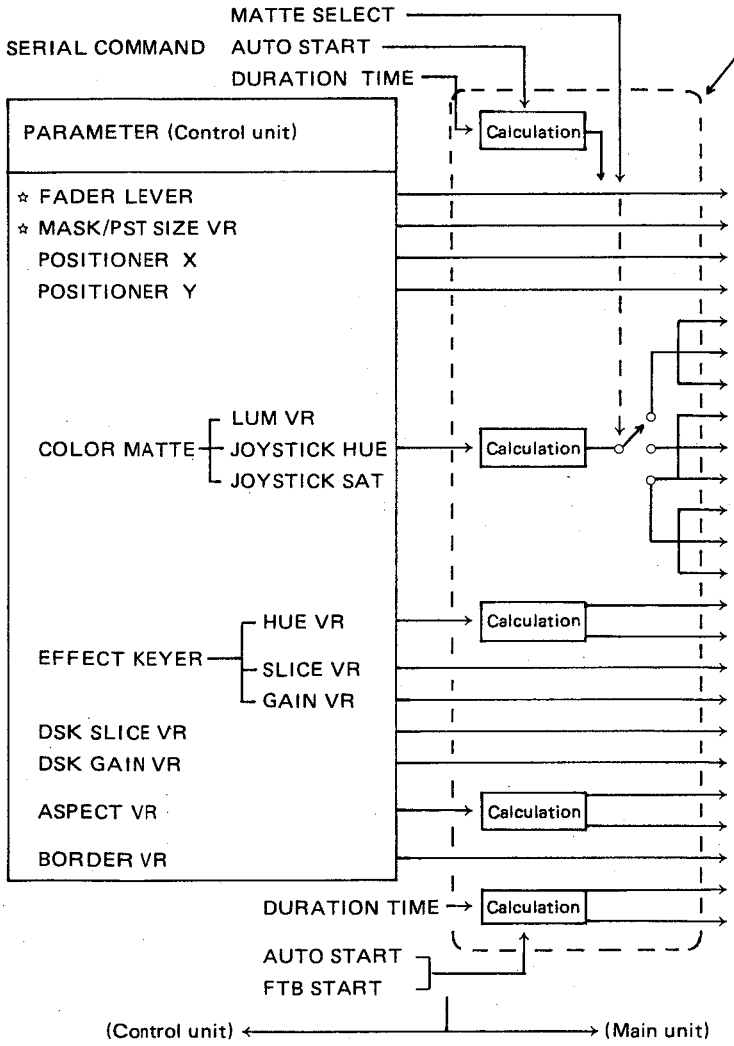


Fig. 2-1

2.4 MT (Mother) CIRCUIT BOARD

This is the Mother circuit board that connects all the other circuit boards. A D/A converter (IC5) on this circuit board converts the various parameters digitized on the control unit into analog values.
The various parameters digitized here include position data from the fader lever and various knobs. This is explained in the description of the A/D converter on the DI circuit board.
The main unit processes digital pulses that are sent as serial data from the control unit and converts this data into the parameters required by the main unit. For instance in chroma keying, the hue is set by turning the HUE knob on the control unit and R-Y and B-Y data are produced by calculating using HUE knob position information. This data is converted to analog values (DC values) by a D/A converter on the MT circuit board and sent to the KEY circuit board. The relationship between parameters sent from the control unit and parameters used by the main unit is shown in Fig. 2-2.


SERIAL COMMAND
MATTE SELECT
AUTO START
DURATION TIME
PROCESSING INSIDE CPU
PARAMETER (Control unit)
☆ FADER LEVER
☆ MASK/PST SIZE VR
POSITIONER X
POSITIONER Y
COLOR MATTE
LUM VR
JOYSTICK HUE
JOYSTICK SAT
EFFECT KEYER
HUE VR
SLICE VR
GAIN VR
DSK SLICE VR
DSK GAIN VR
ASPECT VR
BORDER VR
Calculation
Calculation
Calculation
Calculation
Calculation
DURATION TIME
AUTO START
FTB START
(Control unit)
(Main unit)

PARAMETER (Main unit)	PARAMETER SELECT DATA D4	D3	D2	D1	D0
☆ EFF FADER	0	0	0	0	0
☆ MASK/PST SIZE	0	0	0	0	1
POSITION H	0	0	0	1	0
POSITION V	0	0	0	1	1
BACK COLOR Y	0	0	1	0	0
BACK COLOR R-Y	0	0	1	0	1
BACK COLOR B-Y	0	0	1	1	0
BORDER COLOR (EFF MATTE) Y	0	0	1	1	1
BORDER COLOR (EFF MATTE) R-Y	0	1	0	0	0
BORDER COLOR (EFF MATTE) B-Y	0	1	0	0	1
DSK MATTE Y	0	1	0	1	0
DSK MATTE R-Y	0	1	0	1	1
DSK MATTE B-Y	0	1	1	0	0
CHROMA KEY R-Y	0	1	1	0	1
CHROMA KEY B-Y	0	1	1	1	0
KEY SLICE	0	1	1	1	1
KEY GAIN	1	0	0	0	0
DSK SLICE	1	0	0	0	1
DSK GAIN	1	0	0	1	0
ASPECT X	1	0	0	1	1
ASPECT Y	1	0	1	0	0
BORDER WIDTH	1	0	1	0	1
☆ D FADER (DSK AUTO)	1	0	1	1	0
☆ B FADER (FADE TO BLACK)	1	0	1	1	1

☆ = 12-bit data, Others = all 8-bit data

Fig. 2-2

12-bit and 8-bit data are used in calculating, depending on the parameter. When processing 12-bit data, LDA 0 - 3 and DA 0 - 7 are input to the D/A converter (IC5); when only 8 bits are used, only DA 0 - 7 is input to the D/A converter. Among the parameters used by the main unit, D FADER and B FADER can be controlled by serial commands from the control unit. D FADER is the control voltage when sending DSK in the AUTO mode, and B FADER is a control voltage for fade-to-black.

The EFF (Effect) FADER is controlled by serial commands only when the fader lever is moved in the AUTO mode.

COLOR MATTE (LUM/HUE/SAT) parameters from the remote control are fetched to the CPU together with the MATTE SELECT serial command and are used to derive each matte color (back color, border color, DSK color).

D4 - D0 supply parameter selection data input to the analog data latch circuit (IC1-3) and IC selector (IC6). IC1-3 latch all parameters that are converted to analog values until reloading is finished.

2.5 CP (Cross-Point) CIRCUIT BOARD

This circuit board sends the input video signal that is selected by the Cross-Point Select Button to each bus. A block diagram is shown in the Fig. 2-3. All the input video signals are Y/R-Y/B-Y component signals.

2.5.1 COLOR BAR/BLACK signal

The color bar signal is input from the KSG circuit board to analog switch IC23 which switches the color bar signal and black signal. Switching is controlled by the COLOR BARS ON signal from the CPU.

The black signal generated has no sync, setup or burst.

The color bars/black signal passes through a buffer and then goes to the Cross-Point circuit after its pedestal is clamped at 5 V at CP in the CBM.

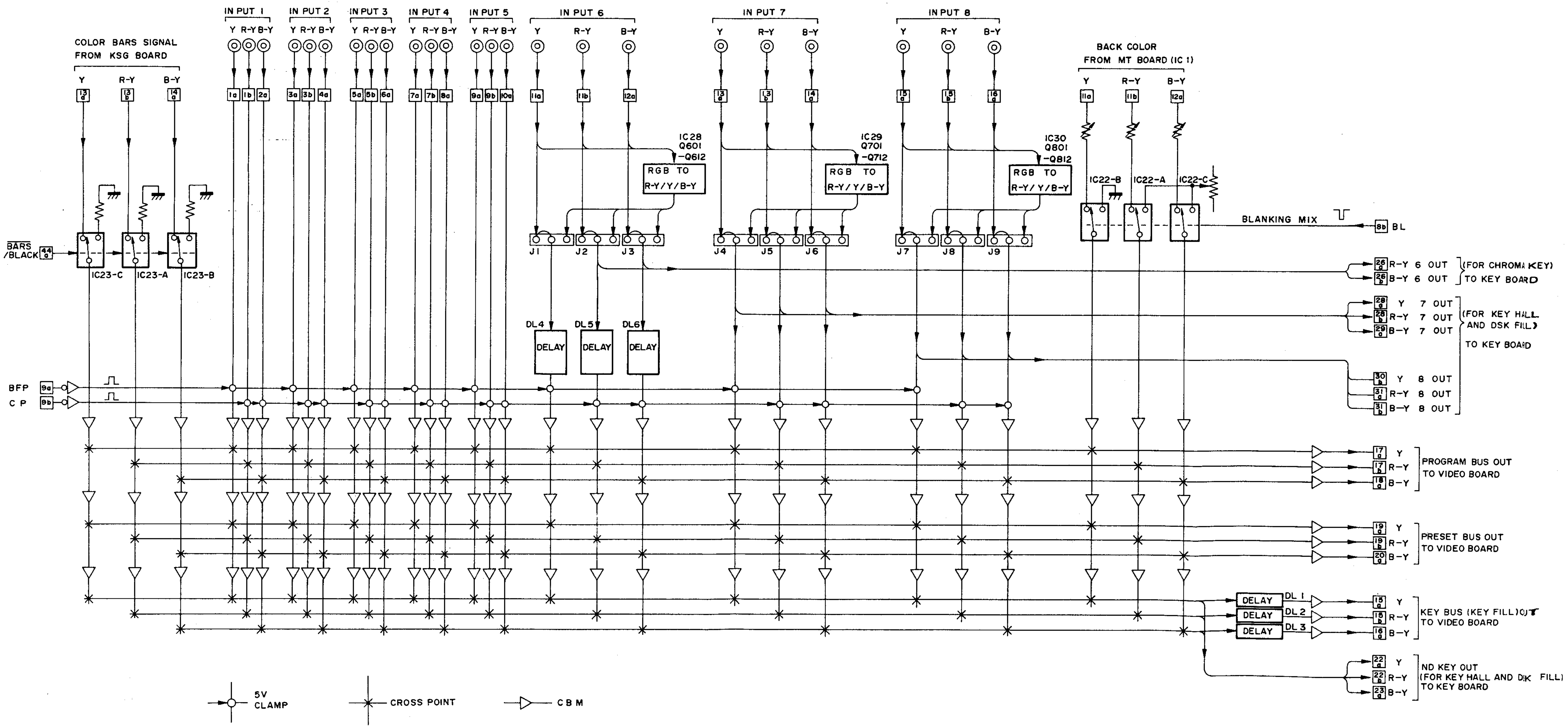

COLOR BARS SIGNAL FROM KSG BOARD
Y
R-Y
B-Y
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT 8
Y R-Y B-Y
BACK COLOR FROM MT BOARD (IC 1)
IC28 Q601 -Q612
IC29 Q701 -Q712
IC30 Q801 -Q812
RGB TO R-Y/Y/B-Y
IC22-B
IC22-A
IC22-C
BLANKING MIX
8b BL
BARS /BLACK 44a
IC23-C
IC23-A
IC23-B
J1
J2
J3
J4
J5
J6
J7
J8
J9
DL4
DL5
DL6
DELAY
BFP 9a
C P 9b
26a R-Y 6 OUT
26b B-Y 6 OUT
(FOR CHROMA KEY) TO KEY BOARD
28a Y 7 OUT
28b R-Y 7 OUT
29a B-Y 7 OUT
(FOR KEY HALL AND DSK FILL) TO KEY BOARD
30b Y 8 OUT
31a R-Y 8 OUT
31b B-Y 8 OUT
17a Y
17b R-Y
18a B-Y
PROGRAM BUS OUT TO VIDEO BOARD
19a Y
19b R-Y
20a B-Y
PRESET BUS OUT TO VIDEO BOARD
DELAY DL 1
DELAY DL 2
DELAY DL 3
15a Y
15b R-Y
16a B-Y
KEY BUS (KEY FILL) OUT TO VIDEO BOARD
22a Y
22b R-Y
23a B-Y
ND KEY OUT (FOR KEY HALL AND DSK FILL) TO KEY BOARD
5V CLAMP
CROSS POINT
C B M

Fig. 2-3

1-21

2.5.2 Input 1 – 8 (Y/R-Y/B-Y)

Inputs 1 - 8 are each input to an independent "CP IN" CBM. They pass through the buffer and are supplied to the cross-point of each bus after the pedestal is clamped at 5 V. The KEY input from inputs 7 - 8 are not input to this board but are input to the KEY circuit board.

Inputs 6 - 8 can be RGB signals.

Connectors J1 - J9 perform switching between R/G/B and Y/R-Y/B-Y. The circuit consisting of IC28 and Q601 - Q602 is a Y/R-Y/B-Y transcoder for Input 6. When R/G/B signals are input, they pass through this circuit and are then converted to Y/R-Y/B-Y signals. The same circuit is provided for inputs 7 - 8. Only input 6 among inputs 1 - 8 passes through a 100 nsec delay line before being input to the cross-point of each bus. This is to compensate for phase delay of the keyhole and key fill pictures (input 6 pictures) that is caused in the process of making Chroma Key keyholes.

2.5.3 BACK COLOR signal

The back color signal is obtained by the blanking mix of D/A converter output BACK COLOR and Y/R-Y/B-Y (DC 0 - 5 V) described in the section 2.4 in IC22.

The back color signal passes through a buffer and is supplied to the cross-point circuit after the blanking period is clamped at 5 V in the CP IN CBM.

2.5.4 Cross-point circuit

The cross-point circuit of each bus consists of a multiplexer. IC2 - IC19 are the multiplexers and the switching signal differs for each bus. The relationship between the PGM SEL D0 - D3 switching signals of the PROGRAM BUS and selected inputs is shown in Table 2-1.

The PST SEL D0-D3, KEY SEL D0-D3 switching signals of the PRESET BUS and KEY BUS also switch each bus input in the same way as PGM SEL.

PGM/PST/KEY SEL D0-D3 are controlled by the CPU.

PGM SEL				SELECTED INPUT
D3	D2	D1	D0	
0	0	0	0	COLOR BAR/BLACK
0	0	0	1	INPUT 1
0	0	1	0	INPUT 2
0	0	1	1	INPUT 3
0	1	0	0	INPUT 4
0	1	0	1	INPUT 5
0	1	1	0	INPUT 6
0	1	1	1	INPUT 7
1	0	0	0	INPUT 8
1	0	0	1	BACK COLOR

Table 2-1

2.5.5 Bus outputs

The video signal on each bus selected by the cross-point circuit passes through a buffer and is supplied to the VIDEO circuit board where it is processed. The KEY BUS output becomes the key fill video signal of the effect keyer and it passes through a 120 nsec delay line to compensate for the phase delay with the keyhole when self-keying.

2.5.6 ND key out

The ND KEY OUT signal is selected at the cross-point of the key bus. It is the same as the key bus output but it does not pass through the delay line as it is used for the keyhole on the KEY circuit board.

It is used for the keyhole by the effect keyer and is used for both the keyhole and key fill by DSK.

2.5.7 R-Y/B-Y 6 out

These are sent to the KEY circuit board and become the Chroma Key keyhole.

2.5.8 Y/R-Y/B-Y 7, 8 out

These are sent to the KEY circuit board and are used as the keyhole of the effect keyer and the keyhole and key fill of DSK.

2.6 WF (Waveform Generator) CIRCUIT BOARD

The WF circuit board generates the wipe gate signals that are required for wipe effects, key masks and preset patterns. The circuit is divided into the wipe waveform generator section required to produce wipe gate signals and the waveform processing section.

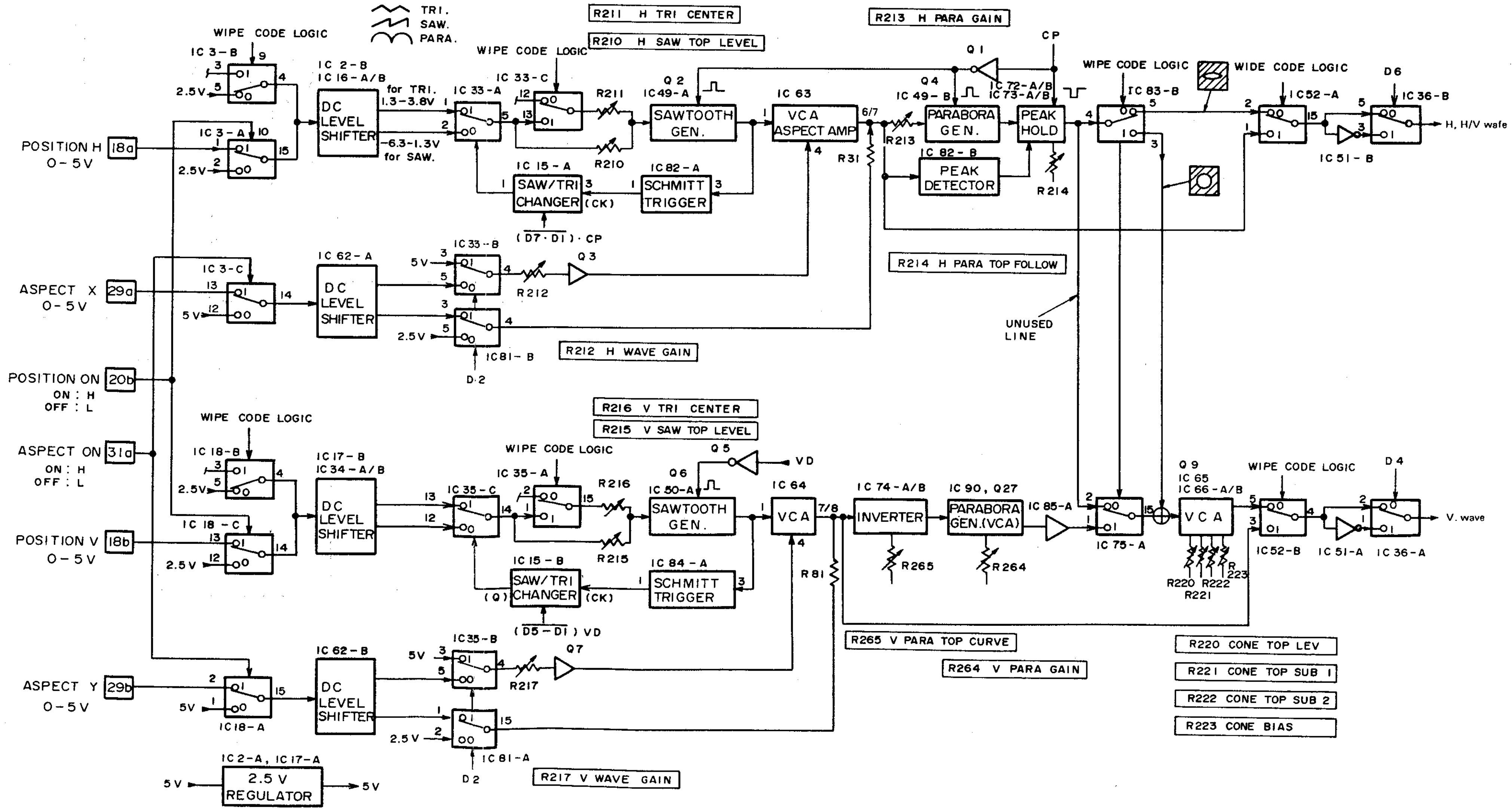
2.6.1 Waveform generation section

Waveforms generated in the KM-3000 are sawtooth waves, triangle waves and parabola waves. These waveforms are generated separately for the H frequency and V frequency. A block diagram is shown in Fig. 2-4.

(1) Sawtooth wave/triangle wave generating circuit

The H frequency sawtooth waveform is obtained by integrating the fixed voltage (generated by DC-level shifter IC2-8, IC16-A/B) with CP timing; IC49-A and Q2 form the integrating circuit. The time constant of the waveform is set so that the level is 2.5 V with 0 V as the reference point when the positioner is off and the aspect is off. For the triangle waveform, the time constant becomes 1/2 and the tangent of the waveform is doubled. Switching of the time constant is performed by switching the analog switch IC33-C with the wipe code. IC 82-A is a comparator but it boots flip-flop IC15-A when the peak value of the triangle wave reaches 2.5 V. When the flip-flop is booted, IC33-A is switched and the charging voltage of the integrating circuit is inverted, with 0 V as reference. By this, the waveform starts decaying with the capacitor discharging with the same time constant as in charging and a triangle waveform is obtained. The KM-2000 uses a different method in which the triangle waveform is obtained by integrating the pulse with a duty of 50%.

For the V frequency, the method is the same except that the waveform is obtained by integrating VD instead of CP at H frequency.



TRI.
SAW.
PARA.
WIPE CODE LOGIC
POSITION H 18a
0 - 5V
ASPECT X 29a
0 - 5V
POSITION ON 20b
ON : H
OFF : L
ASPECT ON 31a
ON : H
OFF : L
POSITION V 18b
0 - 5V
ASPECT Y 29b
0 - 5V
DC LEVEL SHIFTER
for TRI. 1.3-3.8V
-6.3-1.3V for SAW.
R211 H TRI CENTER
R210 H SAW TOP LEVEL
R213 H PARA GAIN
SAWTOOTH GEN.
VCA ASPECT AMP
PARABORA GEN.
PEAK HOLD
PEAK DETECTOR
SAW/TRI CHANGER
SCHMITT TRIGGER
(D7·D1)·CP
R214 H PARA TOP FOLLOW
R212 H WAVE GAIN
UNUSED LINE
WIDE CODE LOGIC
H, H/V wafe
CP
R216 V TRI CENTER
R215 V SAW TOP LEVEL
VD
VCA
INVERTER
PARABORA GEN.(VCA)
(D5-D1) VD
R265 V PARA TOP CURVE
R264 V PARA GAIN
R217 V WAVE GAIN
R220 CONE TOP LEV
R221 CONE TOP SUB 1
R222 CONE TOP SUB 2
R223 CONE BIAS
V. wave
2.5 V REGULATOR
5V
IC 2-A, IC 17-A

Fig. 2-4 Waveform generation circuit

(2) H parabola waveform generating circuit

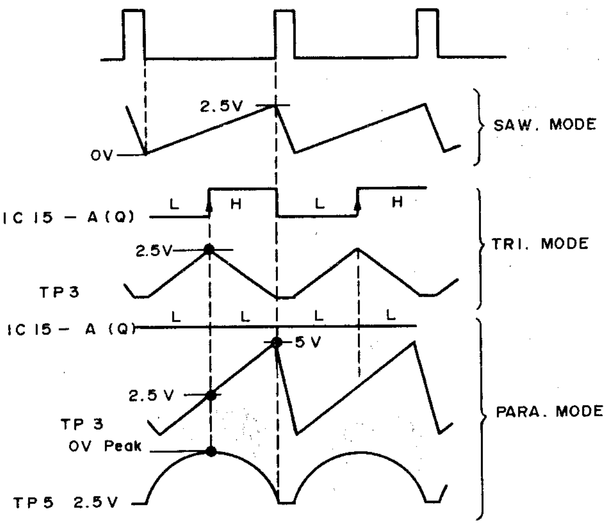


Fig. 2-5

The parabola waveform is obtained by integrating the differential voltage between sawtooth and 2.5 V reference voltage. The time constants are the same as those of the triangle waveform. However, charging continues and a sawtooth waveform with twice the level is obtained as a result because the flip-flop will not be booted by the wipe code (refer to Fig. 2-5). This passes through the aspect amplifier then is integrated and the parabola waveform is obtained.

The H frequency parabola waveform is input to the peak hold circuit consisting of IC72 and IC73 and the peak value is kept constant.

(3) H parabola waveform peak hold circuit

This circuit suppresses fluctuations of the peak level due to the dynamic uneveness of the integrating circuit for parabola waveform generation, to make it constant.

When the parabola waveform reaches its peak level, the original sawtooth waveform level becomes exactly 2.5 V. By using this fact, when the sawtooth waveform level exceeds 2.5 V, comparator IC82-B becomes active "L" and a negative pulse is produced by the differential circuit consisting of R40-R42/C16/D2.

This pulse opens switch gate IC83-A, and the peak level of parabola waveform is sample held in C14. The peak level is sample held in C15 with the timing of the next CP (the next parabola wave) and is reversed at IC72-A and is added to IC72-B varying the gain of the parabola waveform. That is, when the peak level is high, a voltage is applied so that the level becomes low, and when the peak level is low, a voltage is applied so that the level becomes high. This makes the peak level at 0 V constant.

(4) V parabola waveform generating circuit

The V parabola waveform is obtained by inputting the V frequency triangle waveform to a VCA.

The triangle waveform is reversed at IC74-B before being input to the VCA and becomes negative. When these are added simultaneously to the reverse input and the control input of the VCA, the parabola waveform is output.

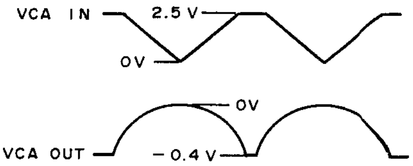


Fig. 2-6

(5) Positioner circuit

This circuit shifts the phase of the sawtooth waveform and the triangle waveform by the positioner voltage D/A converted on the MT circuit board. Phase shifting is performed by varying the reference voltage of the integration circuit by the positioner voltage. An example of the sawtooth and triangle waveforms is shown in Fig. 2-7. The phase of the saw tooth waveform is changed as the peak value is set at 2.5 V. The DC level of the sawtooth waveform is changed and the phase is shifted by passing it through the comparator circuit in the waveform processing circuit.

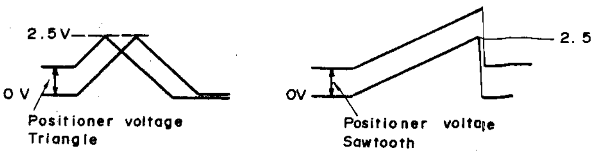


Fig. 2-7

(6) Aspect circuit

This circuit changes the aspect of the wipe waveform. The aspect is changed by changing the gain of the H and V waveforms. IC63 is the VCA that changes the gain of the H waveform. This VCA varies the aspect in the following two ways.

1. The gain of the VCA is varied. The waveform changes with 2.5 V at its center by varying the gain, as 2.5 V is supplied as the reverse input.

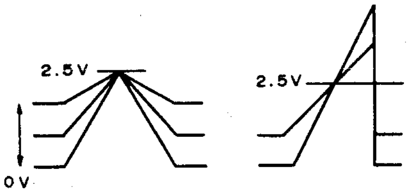


Fig. 2-8

2. The gain of the VCA is kept constant and the DC level of the output waveform is varied. The DC level that is applied to ⑥ pin of IC63 is the DC level of the output waveform. When the aspect circuit is off, it is 2.5 V, when the aspect is on, it varies from 2.5 V - 7.5 V.

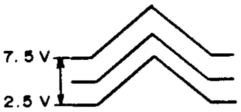
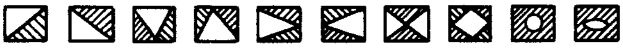


Fig. 2-9

Patterns that use method 1 are as follows.



Method 2 is used for other patterns. Changing gain changes the wipe signal width and the aspect is changed by this.

(7) Waveform selection circuit

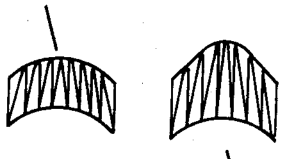
After processes (1) - (6), the waveform is selected by the wipe code and the waveform required for each wipe pattern is formed.

The wipe codes are codes used for different wipe patterns and controls the sections of the waveform generation circuit. The wipe codes corresponding to each pattern (normal/reverse) are shown in Table 2-2.

The waveform selection circuit consists of analog switches, and includes an inverter for reverse waveforms and a VCA for round wipe waveforms. Analog switches IC83-B and IC75-A perform switching of the ▨ and ▨ patterns. IC52-A/B performs switching between a sawtooth or triangle waveform and a parabola waveform. IC36-A/B performs switching between the normal waveform and the reverse waveform. The reverse waveform is generated by inverter IC51-A/B . IC36-A performs switching between the H waveform and H/V mixed waveform. The VCA for the round waveform is IC65. This VCA is used as a squaring circuit and works as a square-root circuit when inserted into the negative feedback loop of buffer IC66-A. When the round wipe is selected, the H frequency and V frequency parabola waveforms are mixed and then input to the square-root circuit to derive the wipe signal by the analog switch IC83-B and IC75-A described previously.

Compared with the conventional round wipe signal used in the KM-2000, this has the advantage that the edges are not blurred even when the wipe pattern becomes small.

Conventional waveform (KM-2000/1200)



Waveform of KM-3000

Fig. 2-10 Round wipe signal
(H/V mixed waveform, V-rate)

(8) Output waveform

The output waveforms that appear at points Ⓐ and Ⓑ in the block diagram and the status of the analog switch in each wipe pattern are shown in Table 2-3. The output waveform is input to the comparator circuit in the waveform processing circuit.

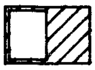
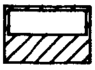
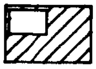
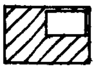
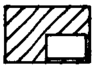
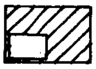
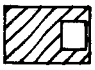
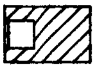
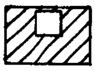
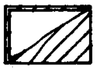
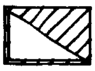
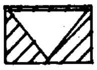
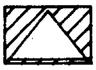
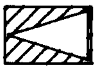
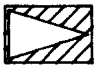
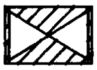
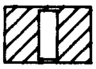
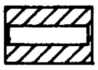
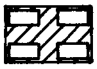
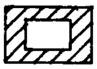
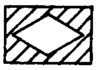
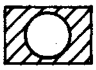
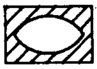
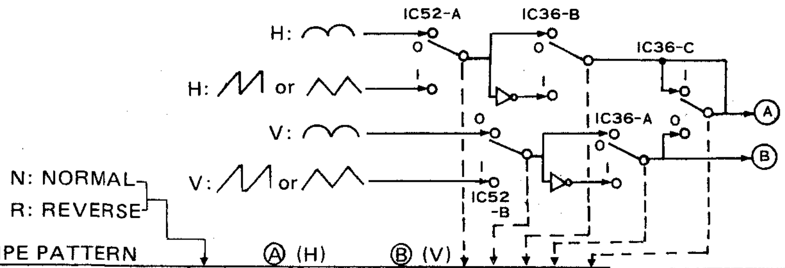
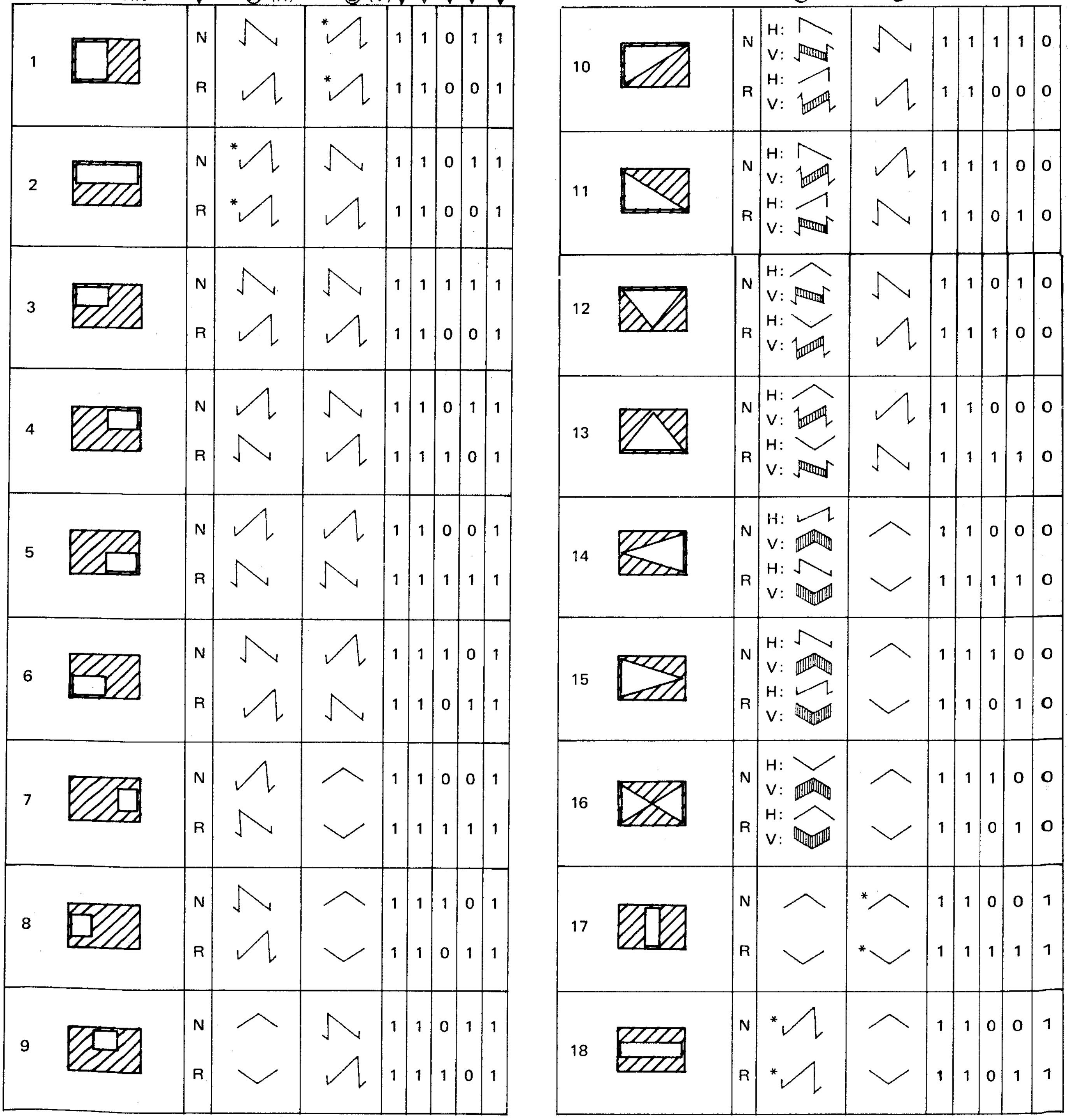
WIPE PATTERN		WIPE CODE															
		NORMAL								REVERSE							
		D7	D6	D5	D4	D3	D2	D1	D0	D7	D6	D5	D4	D3	D2	D1	D0
0		0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
1		0	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0
2		0	0	0	1	0	1	1	1	0	0	0	0	0	1	1	1
3		0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1
4		0	0	0	1	0	1	0	0	0	1	0	0	0	1	0	1
5		0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	1
6		0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	1
7		0	0	1	0	0	1	0	0	0	1	1	1	0	1	0	1
8		0	1	1	0	0	1	0	0	0	0	1	1	0	1	0	1
9		1	0	0	1	0	1	0	0	1	1	0	0	0	1	0	1
10		0	1	0	1	0	0	1	1	0	0	0	0	0	0	1	1
11		0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	1
12		1	0	0	1	0	0	1	1	1	1	0	0	0	0	1	1
13		1	0	0	0	0	0	1	1	1	1	0	1	0	0	1	1
14		0	0	1	0	0	0	1	1	0	1	1	1	0	0	1	1
15		0	1	1	0	0	0	1	1	0	0	1	1	0	0	1	1
16		1	1	1	0	0	0	1	1	1	0	1	1	0	0	1	1
17		1	0	1	0	0	1	1	0	1	1	1	1	0	1	1	0
18		0	0	1	0	0	1	1	1	0	0	1	1	0	1	1	1
19		1	1	1	1	0	1	0	0	1	0	1	0	0	1	0	1
20		1	0	1	0	0	1	0	0	1	1	1	1	0	1	0	1
21		1	0	1	0	0	0	1	1	1	1	1	1	0	0	1	1
22		0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
23		0	0	1	0	0	0	0	1	0	1	1	1	0	0	0	1

Table 2-2 Wipe code

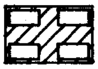
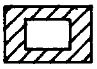
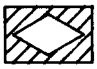
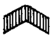
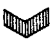
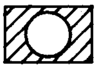
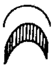
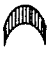
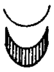
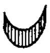
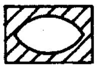
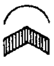
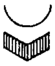

H:
H: or
V:
V: or
IC52-A
IC36-B
IC36-C
IC36-A
IC52 -B
O
I
Ⓐ
Ⓑ
N: NORMAL
R: REVERSE



WIPE PATTERN		Ⓐ (H)	Ⓑ (V)					
1	N		*	1	1	0	1	1
	R		*	1	1	0	0	1
2	N	*		1	1	0	1	1
	R	*		1	1	0	0	1
3	N			1	1	1	1	1
	R			1	1	0	0	1
4	N			1	1	0	1	1
	R			1	1	1	0	1
5	N			1	1	0	0	1
	R			1	1	1	1	1
6	N			1	1	1	0	1
	R			1	1	0	1	1
7	N			1	1	0	0	1
	R			1	1	1	1	1
8	N			1	1	1	0	1
	R			1	1	0	1	1
9	N			1	1	0	1	1
	R			1	1	1	0	1
10	N	H: V:		1	1	1	1	0
	R	H: V:		1	1	0	0	0
11	N	H: V:		1	1	1	0	0
	R	H: V:		1	1	0	1	0
12	N	H: V:		1	1	0	1	0
	R	H: V:		1	1	1	0	0
13	N	H: V:		1	1	0	0	0
	R	H: V:		1	1	1	1	0
14	N	H: V:		1	1	0	0	0
	R	H: V:		1	1	1	1	0
15	N	H: V:		1	1	1	0	0
	R	H: V:		1	1	0	1	0
16	N	H: V:		1	1	1	0	0
	R	H: V:		1	1	0	1	0
17	N		*	1	1	0	0	1
	R		*	1	1	1	1	1
18	N	*		1	1	0	0	1
	R	*		1	1	0	1	1

* UNUSED

Table 2-3

19		N	∨	∨	1	1	1	1	1
		R	∧	∧	1	1	0	0	1
20		N	∧	∧	1	1	0	0	1
		R	∨	∨	1	1	1	1	1
21		N	H: ∧ V: 	∧	1	1	0	0	0
		R	H: ∨ V: 	∨	1	1	1	1	0
22		N	H: V: 		0	0	0	0	0
		R	H: V: 		0	0	1	1	0
23		N	H: V: 	∧	0	1	0	0	0
		R	H: V: 	∨	0	1	1	1	0

2.6.2 Waveform processing circuit

This circuit processes the wipe waveform generated in the waveform generating circuit and generates the wipe gate singal. Its block diagram is shown in Fig. 2-11. The circuit is separated roughly into a comparator circuit, an AND/OR circuit, and a wipe gate output circuit.

(1) Comparator circuit

CBM 9 - 16 are comparator circuits. The wipe fader, BORDER, preset pattern (key mask) and border for preset patterns are provided separately, with H and V comparators for each. Each comparator generates a wipe gate signal comparing the wipe waveform input to pin ⑧ of the CBM with the fader voltage input to pin ⑨ of the CBM. The fader voltage is determined by the position of the fader lever. When the wipe waveform is higher than the fader voltage, the wipe gate signal becomes H and when it is lower, the wipe gate signal becomes L.

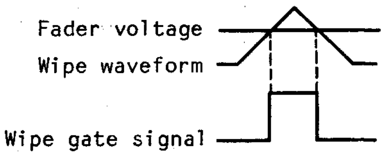

Fader voltage
Wipe waveform
Wipe gate signal

Fig. 2-12

When the border is on (when the BORDER knob is turned), the fader voltages applied to the comparator for the wipe and the border are different; the fader voltage for the wipe effect becomes a little higher and the fader voltage for the border becomes a little lower. As a result, the amplitude of the wipe gate signal for the border is greater than that of the gate signal for the wipe effect. This makes the border effect possible (See the Video circuit board description for details). The level of the fader voltage is shifted in IC30-A/B.

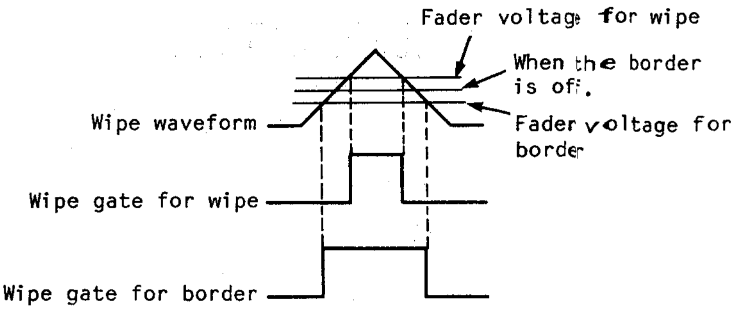

Fader voltage for wipe
When the border is off.
Wipe waveform
Fader voltage for border
Wipe gate for wipe
Wipe gate for border

Fig. 2-13

(2) Softness circuit

This circuit is for blurring the edges in wiping. Edges can be blurred by making the rise and fall gentle. By varying the value of the resistance connected to pins ⑥ and ⑦ of the comparator CBM, the rise and fall at the edge become less steep. SOFTNESS CBM (CBM 1-8) connected to pins ⑥ and ⑦ is a CBM the internal resistance value of which is varied by softness data (SOFTNESS D0-D3) from the CPU.

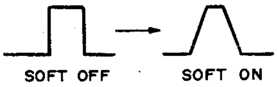

SOFT OFF
SOFT ON

Fig. 2-14 Wipe gate signal when softness is on

The wipe gate signal the border and softness of which have been processed by the comparator is blanking mixed by the analog switch (IC42, 57, 38, 67), then it is clamped at 0 V by the CLAMP CBM (CBM 17-24) and input to the AND/OR circuit or the wipe gate selection circuit.

(3) AND/OR circuit

This circuit mixes the wipe gate signal for the selected wipe pattern. The wipe gate signal used for the following wipe patterns passes through the AND/OR circuit.

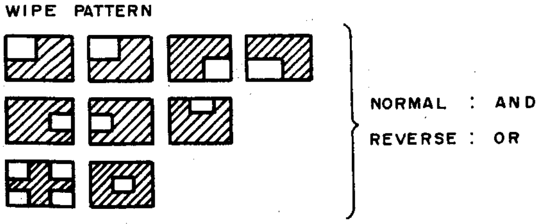

WIPE PATTERN
NORMAL : AND
REVERSE : OR

Fig. 2-15

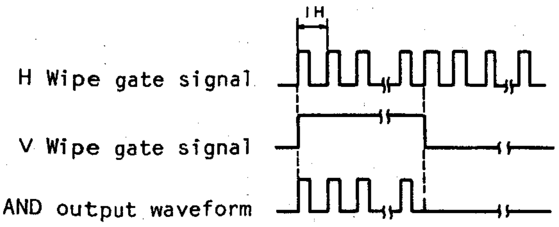
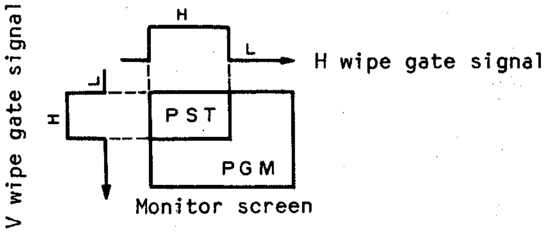

1H
H Wipe gate signal
V Wipe gate signal
AND output waveform

Fig. 2-16

As an example, the wipe gate signal in the normal mode of ▨ pattern when the V frequency is observed is shown in Fig. 2-16.

The monitor screen is as shown below when the AND output is output. (PRESET BUS (PST) is output in the H period for each waveform.)


V wipe gate signal
H
L
H
L
H wipe gate signal
PST
PGM
Monitor screen

PGM: Program bus screen
PST: Preset bus screen
▨ : Normal mode

Fig. 2-17

In the reverse mode, OR output is output. The waveforms and output screens in the reverse mode are as follows.

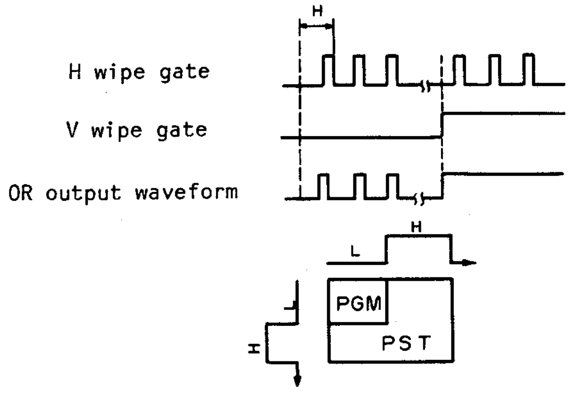

H
H wipe gate
V wipe gate
OR output waveform
H
L
PGM
PST
H

Fig. 2-18

The output of the AND/OR circuit is input to the wipe gate selection circuit.

(4) Wipe gate selection circuit

Wipe code D0-D2 selects the wipe gate signal used for each wipe pattern. IC68 - 71 are the multiplexers used for selection. The H wipe gate signal, the V wipe gate signal, and the output of the AND/OR circuit are selected depending on the wipe pattern.

The relationship between the wipe code and selected gate signal is shown below.

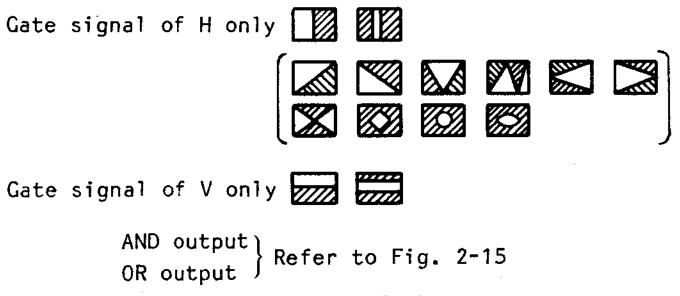

Gate signal of H only
Gate signal of V only
AND output
OR output
Refer to Fig. 2-15

Fig. 2-19

The gate signal enclosed by brackets ( ) is a waveform that is already H/V mixed in the waveform selection circuit described previously.

(5) Output circuit

Each signal that passes through the wipe gate selection circuit is output to each circuit board as shown by a) - e). a) - c) are clipped and sliced on this circuit board and output at constant level. d) and e) are clipped and sliced on the KEY circuit board and their levels are kept constant.

a) Gate signal for the wipe effect (B. WIPE GATE)

IC87-A is switched to EXT WIPE when EXT wipe is selected. The gate signal for the wipe effect is input to the VIDEO circuit board and is used for the PRESET BUS and PROGRAM BUS wipe effects.

b) Gate signal for border (B. WIPE GATE)

This is output after being input to the AND circuit together with the reversed gate signal for wipe effect (CBM34). This signal is used for the border effect on the PRESET BUS and PROGRAM BUS on VIDEO circuit board.

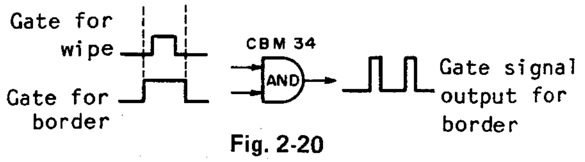

Gate for wipe
Gate for border
CBM 34
AND
Gate signal output for border

Fig. 2-20

Analog switch IC80 is switched to GROUND when the border is off (BORDER knob fully counterclockwise) and the gate signal for the border is not output.

c) Key wipe gate signal (K. WIPE GATE)

This is the same as the gate signal for the border but it does not pass through the CBM34 AND circuit. This signal is used in the wipe effect to send a key signal to the PROGRAM BUS on the VIDEO circuit board. IC80-C is an analog switch

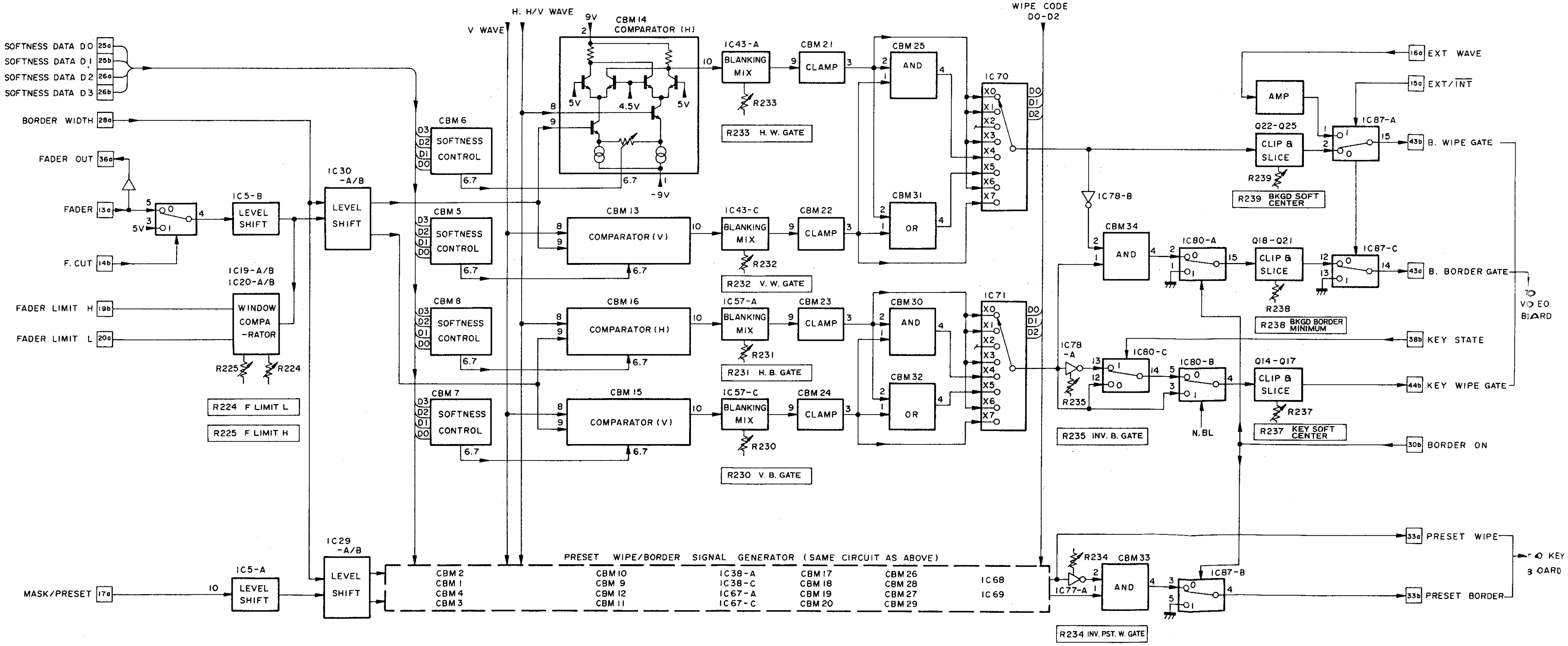

SOFTNESS DATA D0 25a
SOFTNESS DATA D1 25b
SOFTNESS DATA D2 26a
SOFTNESS DATA D3 26b
BORDER WIDTH 28a
FADER OUT 36a
FADER 13a
F. CUT 14b
FADER LIMIT H 19b
FADER LIMIT L 20a
MASK/PRESET 17a
IC5-B LEVEL SHIFT
IC5-A LEVEL SHIFT
IC19-A/B IC20-A/B WINDOW COMPA-RATOR
R225 R224
R224 F LIMIT L
R225 F LIMIT H
IC30 -A/B LEVEL SHIFT
IC29 -A/B LEVEL SHIFT
V WAVE
H. H/V WAVE
CBM6 SOFTNESS CONTROL
CBM5 SOFTNESS CONTROL
CBM8 SOFTNESS CONTROL
CBM7 SOFTNESS CONTROL
CBM14 COMPARATOR (H)
CBM13 COMPARATOR (V)
CBM16 COMPARATOR (H)
CBM15 COMPARATOR (V)
9V 5V 4.5V 5V -9V 6.7
IC43-A BLANKING MIX
IC43-C BLANKING MIX
IC57-A BLANKING MIX
IC57-C BLANKING MIX
R233 H. W. GATE
R232 V. W. GATE
R231 H. B. GATE
R230 V. B. GATE
CBM21 CLAMP
CBM22 CLAMP
CBM23 CLAMP
CBM24 CLAMP
CBM25 AND
CBM31 OR
CBM30 AND
CBM32 OR
IC70
IC71
X0 X1 X2 X3 X4 X5 X6 X7 D0 D1 D2
WIPE CODE D0-D2
PRESET WIPE/BORDER SIGNAL GENERATOR (SAME CIRCUIT AS ABOVE)
CBM2 CBM1 CBM4 CBM3
CBM10 CBM9 CBM12 CBM11
IC38-A IC38-C IC67-A IC67-C
CBM17 CBM18 CBM19 CBM20
CBM26 CBM28 CBM27 CBM29
IC68 IC69
IC78-B
CBM34 AND
IC80-A
IC78 -A
IC80-C
IC80-B
N.BL
R235 INV. B. GATE
AMP
Q22-Q25 CLIP & SLICE
R239 BKGD SOFT CENTER
Q18-Q21 CLIP & SLICE
R238 BKGD BORDER MINIMUM
Q14-Q17 CLIP & SLICE
R237 KEY SOFT CENTER
IC87-A
IC87-C
IC87-B
IC77-A
R234 CBM33 AND
R234 INV. PST. W. GATE
16a EXT WAVE
15a EXT/INT
43b B. WIPE GATE
43a B. BORDER GATE
38b KEY STATE
44b KEY WIPE GATE
30b BORDER ON
33a PRESET WIPE
33b PRESET BORDER
TO VIDEO BOARD
TO KEY BOARD

Fig. 2-11 Waveform processing circuit

that is switched by the KEY STATE signal from the CPU. The fader voltage is changed from 0 to 5 V by lever movement when the key effect is supplied to the main line . The fader voltage is forcibly changed from 5 to 0 V by the F CUT signal when transmission is complete, with the lever moved to the end. By this, the key wipe gate signal is reset to the starting point of key transmission and the key effect disappears from the program monitor. To avoid this, when key transmission is complete, the KEY STATE signal is booted and the reset key wipe gate signal is reversed, keeping the key effect on. IC80-B is an analog switch for mixing the reversed gate signal with the blanking signal.

d) Preset wipe gate signal (PRESET WIPE)

This is used for the keyhole of the PST PTN effect wipe pattern on the KEY circuit board.
The width of the gate signal is set by the PST SIZE that is D/A converted on the MT circuit board.

e) Preset border gate signal (PRESET BORDER)

This is used for the border keyhole of the PST PTN effect on the KEY circuit board. The border width that changes the width of the gate signal is a DC value that is D/A converted on the MT circuit board. The B. BORDER GATE signal width is also changed to this value at the same time.

2.7 KEY (Effect Keyer/DSK) CIRCUIT BOARD

This circuit board contains three main circuits.

1. Keyhole generating circuit for effect keyer
2. Border color/effect matte signal generating circuit
3. DSK circuit

2.7.1 Keyhole generating circuit of effect keyer

(1) Key source select circuit

Chroma keying and luminance keying are done by the effect keyer.

a) Chroma key

A keyhole is generated by taking out the specific color from the color difference signals input from Input 6 on the rear panel. R-Y 6 and B-Y 6 are each clamped at -4 V then are input to VCAs. IC2 is the VCA for the R-Y signal and the control voltage is the CHROMA R-Y signal that is D/A converted on the MT circuit board. CHROMA R-Y is changed by turning the HUE knob of the EFFECT KEYER section.

After the R-Y signal level is set at −1 to 1 in this VCA, it is mixed with the B-Y signal the level of which is also set by the VCA. When mixed, the part that has the highest level becomes the color set by the HUE knob.
This mixed signal passes through the analog switch IC15-B and then its pedestal level will be clamped at 0.4 V after which it is split into two paths. IC15-B switches the chroma key and luminance key. It will be switched by the C KEY/LUM KEY signal input from the CPU. C KEY/LUM KEY becomes "H" only when the CHROMA 6 button on the control panel is pressed. The signals on both paths are input to the keyhole generating circuit as the key source.

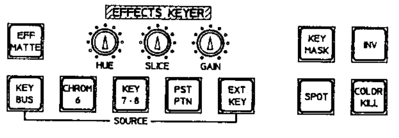

EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7-8
PST PTN
EXT KEY
SPOT
COLOR KILL
SOURCE

Fig. 2-21

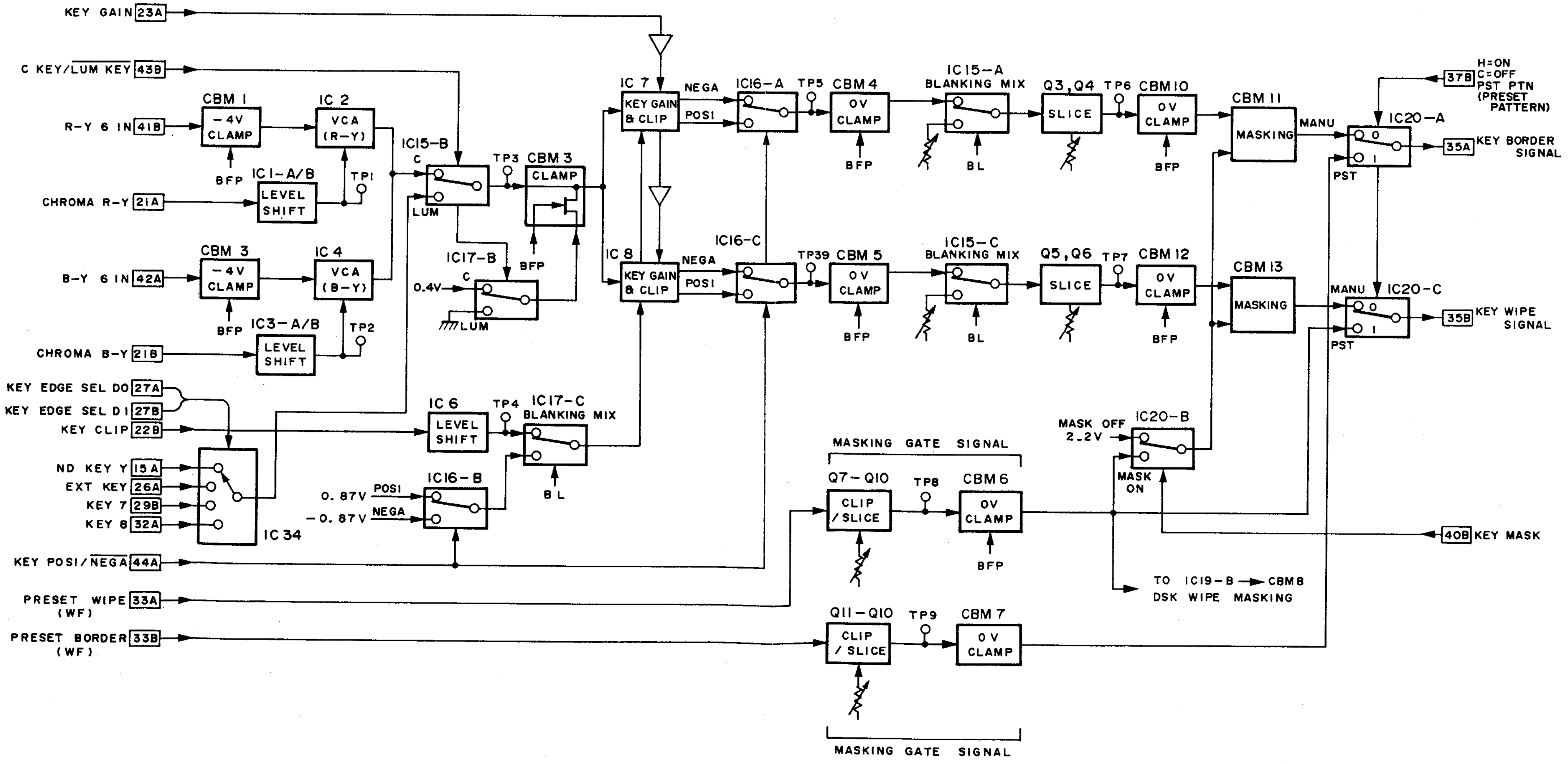

KEY GAIN 23A
C KEY/LUM KEY 43B
R-Y 6 IN 41B
CBM 1
-4V CLAMP
BFP
IC 2
VCA (R-Y)
IC1-A/B
LEVEL SHIFT
TP1
CHROMA R-Y 21A
B-Y 6 IN 42A
CBM 3
-4V CLAMP
BFP
IC 4
VCA (B-Y)
IC3-A/B
LEVEL SHIFT
TP2
CHROMA B-Y 21B
IC15-B
C
LUM
TP3
CBM 3
CLAMP
IC17-B
C
0.4V
LUM
BFP
IC 7
KEY GAIN & CLIP
NEGA
POSI
IC 8
KEY GAIN & CLIP
NEGA
POSI
IC16-A
IC16-C
TP5
CBM 4
0V CLAMP
BFP
TP39
CBM 5
0V CLAMP
BFP
IC15-A
BLANKING MIX
BL
IC15-C
BLANKING MIX
BL
Q3,Q4
SLICE
Q5,Q6
SLICE
TP6
CBM10
0V CLAMP
BFP
TP7
CBM 12
0V CLAMP
BFP
CBM 11
MASKING
CBM13
MASKING
MANU
PST
IC20-A
IC20-C
0
1
37B
H=ON
C=OFF
PST PTN
(PRESET PATTERN)
35A KEY BORDER SIGNAL
35B KEY WIPE SIGNAL
KEY EDGE SEL D0 27A
KEY EDGE SEL D1 27B
KEY CLIP 22B
ND KEY Y 15A
EXT KEY 26A
KEY 7 29B
KEY 8 32A
IC 34
IC 6
LEVEL SHIFT
TP4
IC17-C
BLANKING MIX
BL
IC16-B
0.87V POSI
-0.87V NEGA
KEY POSI/NEGA 44A
PRESET WIPE 33A (WF)
PRESET BORDER 33B (WF)
MASKING GATE SIGNAL
Q7-Q10
CLIP /SLICE
TP8
CBM6
0V CLAMP
BFP
Q11-Q10
CLIP / SLICE
TP9
CBM 7
0V CLAMP
MASKING GATE SIGNAL
MASK OFF 2.2V
IC20-B
MASK ON
40B KEY MASK
TO IC19-B → CBM8 DSK WIPE MASKING

Fig. 2-22 Keyhole generating circuit of EFFECTS KETER

b) Luminance key

IC34 is a multiplexer which switches the key source used for luminance keying using KEY EDGE SEL D0 and D1. D0 and D1 are supplied from the CPU circuit board according to the source selected by the key source button on the panel. The relation between D0 and D1, the key source and the key fill pictures corresponding to each key source are shown in Table 2-4.

KEY SOURCE BUTTONS	KEY EDGE SEL D1	D0	SELECTED KEY SOURCE	AVAILABLE KEY FILL VIDEO
KEY BUS	0	0	ND KEY Y (From CP PCB)	• EFF MATE • KEY BUS VIDEO (Same as Key Source)
EXT KEY	0	1	EXT KEY (From BNC PCB)	• EFF MATTE • KEY BUS VIDEO
KEY 7, 8	1	0	KEY 7 (From BNC PCB)	• EFF MATTE • INPUT 7
	1	1	KEY 8 (From BNC PCB)	• EFF MATTE • INPUT 8

Table 2-4

ND KEY Y is input from the CP circuit board. It is the luminance signal (Y signal) of the picture selected by the KEY BUS.

EXT KEY signal is input to the EXT KEY connector on the rear panel.

KEY7 and KEY8 are the signals that are input via the KEY 7 and KEY 8 connectors. They are switched in conjunction with Inputs 7 and 8 of the KEY BUS.

The key source selected passes through analog switch IC15-B and is input to the keyhole generating circuit after being clamped at 0V in CBM-3.

c) Luminance key

In the case of PST PTN mode, the gate signals (PRESET WIPE, PRESET BORDER) generated in WF circuit board are set to a constant level by the clip/slice circuit, clamped at 0V, and then used as a key source. The border key source and wipe key source are input as key sources, however, the wipe key source is input to the mask circuit described later.

The key source is input to the analog switch IC20-A/C and is switched to the keyhole circuit output (described later) by the PST PIN signal, then it is output to the VIDEO circuit board as the border/wipe keyhole signal. PST PTN signal becomes H level when the PST PTN button is pressed.

(2) Keyhole generating circuit

The key source input from the key source select circuit is input to IC7 and IC8. IC7 and IC8 are VCA.

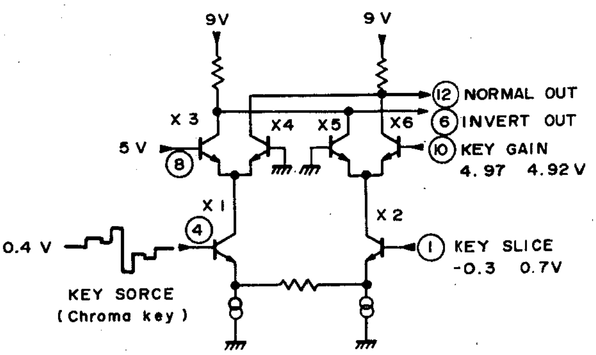


Fig. 2-23

Fig. 2-23 shows the equivalent circuit of a VCA.

The KEY SLICE is amplified with its level set by key source as the center and gain is set with the KEY GAIN.

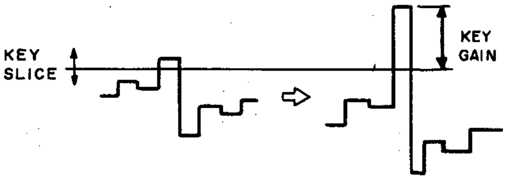


Fig. 2-24

The output of VCA IC8 is switched either to positive or negative at IC16-C, and it is blanking mixed at IC15-C after its pedestal has been clamped at 0V. Whether it is to be negative or positive is selected by INV button.

After blanking mixed, the signal passes through the slice circuit consisting of Q5 and Q6, and signals below a fixed level will be cut. This level is set at the factory and the users cannot adjust it.

The pedestal of the signal that passes through the slice circuit is clamped at 0V and becomes the keyhole output.

The key source that is input to IC7 becomes the keyhole output after the same process, however, variable range of the KEY GAIN from the VCA is slightly different. The gain of IC7 is set to be higher than that of IC8. As a result, a wider keyhole than obtained from IC7 is obtained. This wider keyhole becomes the color killer hole that is used for chroma keying.

The keyhole and color killer hole are input to the masking circuit.

(3) Masking circuit

Masking is a function that makes it impossible for any selected area on the screen to be keyed in the keying operation. Masking is possible by pressing the MASK button.

Any selected area of the screen can be set using a wipe pattern.

CBM11/CBM13 is an AND circuit, and keyhole/color killer hole output and wipe key source that is used for PST PTN are input simultaneously.

The output of the AND circuit becomes the keyhole that is masked by the wipe pattern used for PST PTN.

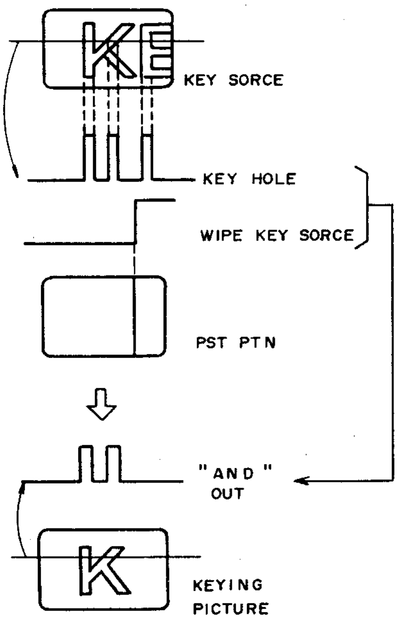

KEY SORCE
KEY HOLE
WIPE KEY SORCE
PST PTN
"AND" OUT
KEYING PICTURE

Fig. 2-25

The output of the masking circuit is input to analog switch IC20-A/C and it is switched to the above PST PTN keyhole and is then output to the VIDEO circuit board.

2.7.2 Border color/effect matte signal generating circuit

The BORDER COLOR Y/R-Y/B-Y input from the MT circuit board has a DC value of 0 - 5 V and is varied by the HUE/SAT joystick or LUM knob.

The border color/effect matte signals are obtained by a blanking mix of this DC value at IC30-A/B/C.

The generated signal is used as the color matte of the effect keyer and the border color of the wipe pattern at the VIDEO circuit board.

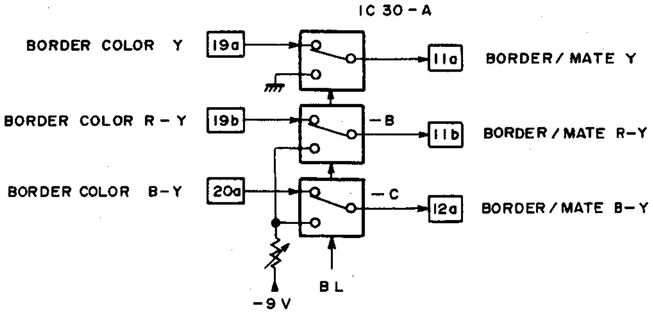

IC 30-A
BORDER COLOR Y
19a
11a
BORDER/MATE Y
BORDER COLOR R-Y
19b
-B
11b
BORDER/MATE R-Y
BORDER COLOR B-Y
20a
-C
12a
BORDER/MATE B-Y
BL
-9V

Fig. 2-26

2.7.3 DSK circuit

This circuit generates the keyhole required for the DSK effect and selects the key fill. A block diagram is shown in Fig. 2-28.

(1) DSK hole generating circuit

This is basically the same as the effect keyer keyhole generation circuit. The key source is selected at IC21. For the selected keyhole, refer to the DSK fill select circuit. The DSK hole generated here is input to the analog switch IC19-C and IC18-C. IC19-C is switched by DSK PVW CTL and it becomes H level when the DSK PVW button on the panel is pressed and then the DSK PVW hole is output to the VIDEO circuit board. IC18-C is switched by the output of comparator IC13 which is switched by the DSK fader voltage. The DSK fader voltage is a DC value of 0 - 5 V that is D/A converted on the MT circuit board and becomes 0 V when DSK is finished and becomes 5 V when DSK is off. When the fader voltage becomes 5 V (when DSK is off), the comparator output becomes L and the DSK hole is cut at IC19-C. When the DSK is on, the comparator becomes H level and it is input to IC18-A. After the blanking level is set by the fader voltage at IC18-A, the DSK hole is output to the VIDEO circuit board.

(2) DSK source and fill select circuit

This circuit selects the DSK source that is sent to the DSK hole generating circuit and DSK fill that is sent to the VIDEO circuit board corresponding to the selected DSK SOURCE button on the panel. Analog switch IC21/22 is switched by the KEY IN D0/D1 that is input from the CPU circuit board. The relation between D0/D1, the switched DSK source and DSK fill is shown in Table 2-5.

The selected DSK fill video is input to IC24-A/B/C which turns "ON" side when the DSK MATTE button on the panel is pressed and DSK MATTE Y/R-Y/B-Y is output. The DSK MATTE Y/R-Y/B-Y signals with a DC value of 0 - 5 V that is D/A converted on the MT circuit board is blanking processed.

When DSK MATTE is off, it is switched to DSK fill and passes through delay line DL1-3 and is output to the VIDEO circuit board.

The delay in DL1-3 is 240 nsec and the phase delay that arises in the DSK hole generation processes is compensated.

DSK SOURCE BUTTONS	KEY IN D1 D0	SELECTED DSK SOURCE	SELECTED DSK FILL VIDEO
KEY BUS	0 0	ND KEY Y	ND KEY Y ND KEY R-Y ND KEY B-Y (KEY BUS VIDEO)
7	0 1	KEY 7 or INPUT 7 Y	INPUT 7 Y INPUT 7 R-Y INPUT 7 B-Y
8	1 0	KEY 8 or INPUT 8 Y	INPUT 8 Y INPUT 8 R-Y INPUT 8 B-Y

Table 2-5

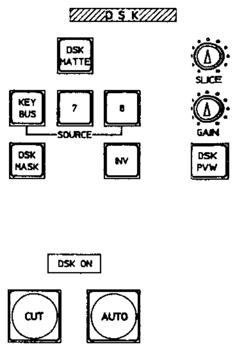

DSK
DSK MATTE
SLICE
KEY BUS
7
8
SOURCE
GAIN
DSK MASK
INV
DSK PVW
DSK ON
CUT
AUTO

Fig. 2-28

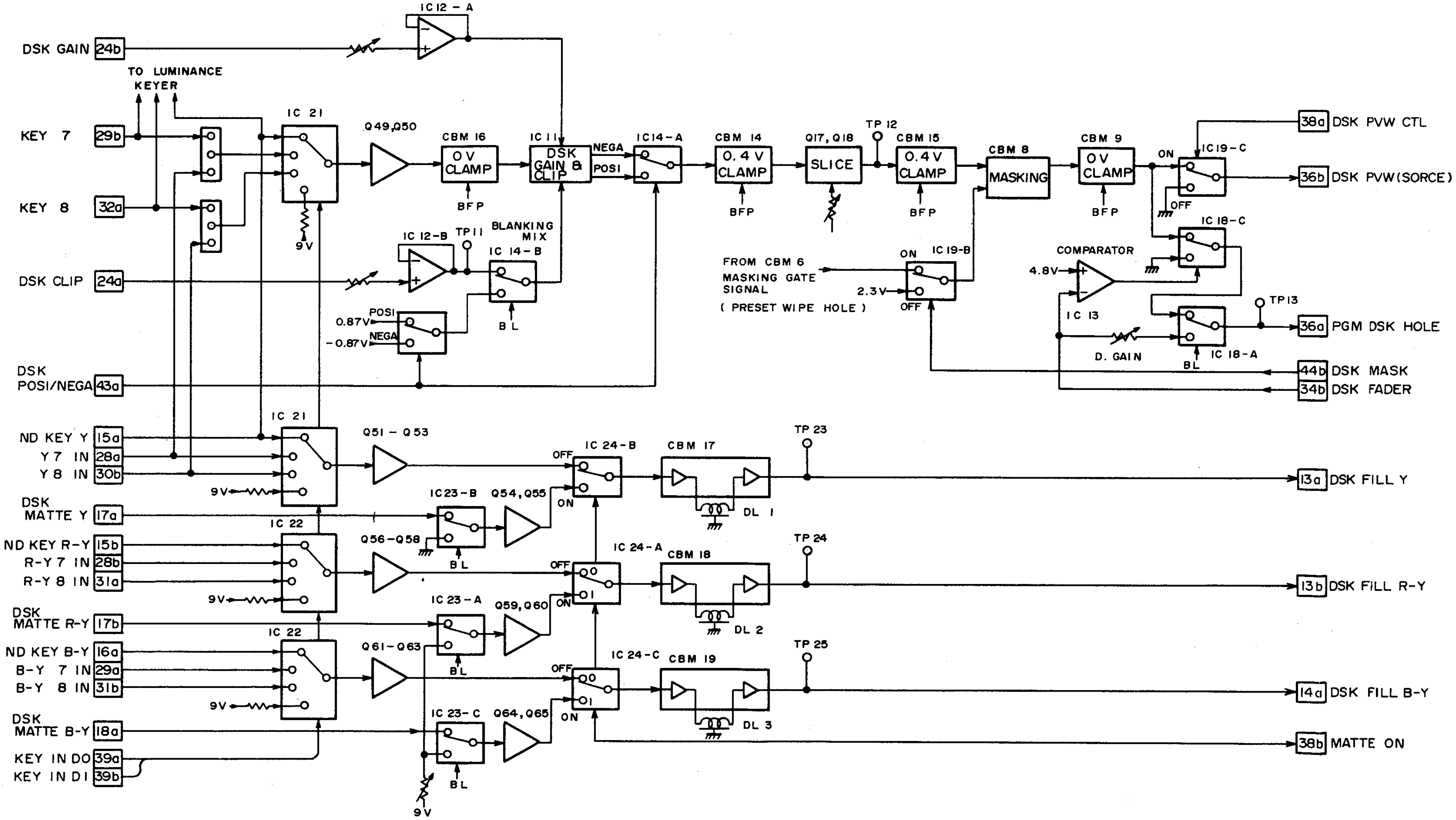

DSK GAIN 24b
IC12-A
TO LUMINANCE KEYER
KEY 7 29b
KEY 8 32a
IC 21
Q49,Q50
CBM 16
0 V CLAMP
BFP
IC 11
DSK GAIN & CLIP
NEGA
POSI
IC14-A
CBM 14
0.4 V CLAMP
Q17, Q18
SLICE
TP 12
CBM 15
0.4 V CLAMP
CBM 8
MASKING
CBM 9
0 V CLAMP
ON
OFF
IC19-C
38a DSK PVW CTL
36b DSK PVW(SORCE)
IC 18-C
9V
DSK CLIP 24a
IC 12-B
TP11
BLANKING MIX
IC 14-B
BL
POSI
NEGA
0.87V
-0.87V
FROM CBM 6 MASKING GATE SIGNAL (PRESET WIPE HOLE)
2.3V
IC 19-B
COMPARATOR
4.8V
IC 13
D. GAIN
TP13
36a PGM DSK HOLE
IC 18-A
44b DSK MASK
34b DSK FADER
DSK POSI/NEGA 43a
ND KEY Y 15a
Y 7 IN 28a
Y 8 IN 30b
DSK MATTE Y 17a
IC 22
ND KEY R-Y 15b
R-Y 7 IN 28b
R-Y 8 IN 31a
DSK MATTE R-Y 17b
ND KEY B-Y 16a
B-Y 7 IN 29a
B-Y 8 IN 31b
DSK MATTE B-Y 18a
KEY IN D0 39a
KEY IN D1 39b
Q51 - Q53
Q56-Q58
Q61-Q63
IC23-B
Q54,Q55
IC 23-A
Q59,Q60
IC 23-C
Q64,Q65
IC 24-B
IC 24-A
IC 24-C
CBM 17
CBM 18
CBM 19
DL 1
DL 2
DL 3
TP 23
TP 24
TP 25
13a DSK FILL Y
13b DSK FILL R-Y
14a DSK FILL B-Y
38b MATTE ON

Fig. 2-27 DSK circuit

2.8 VIDEO CIRCUIT BOARD

The VIDEO circuit board processes the input video signal selected by the cross point circuit to produce various effects. The VIDEO circuit board is divided into an effect amplifier circuit which processes the video signals and a circuit which produces control signals.

2.8.1 Effect amplifier circuit

Independent effect amplifiers are provided the Y/R-Y/B-Y signal components.

The block diagram of the Y signal circuit is shown in Fig. 2-30. The R-Y/B-Y signals are processed in the same way.

This description mainly concerns the effect amplifier of the Y signal.

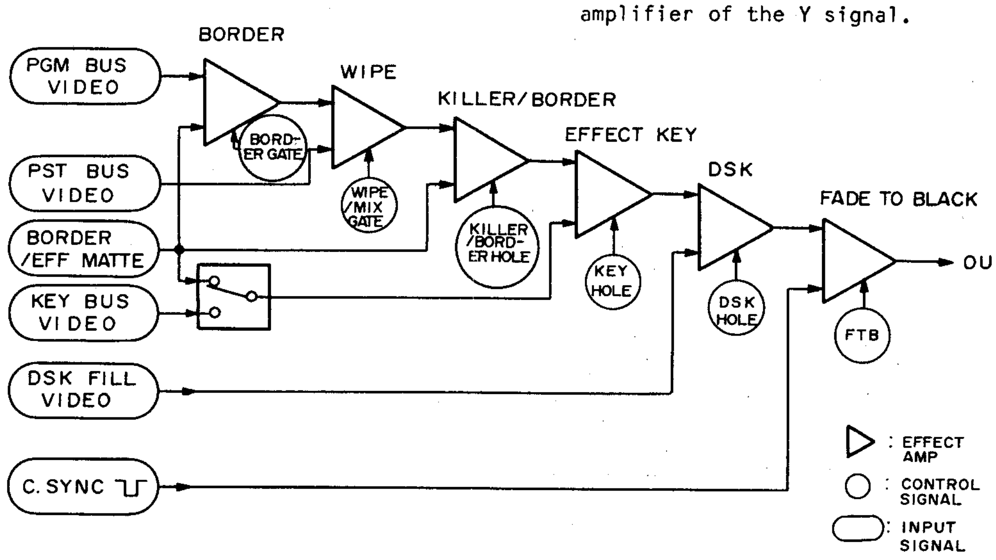

BORDER
WIPE
KILLER/BORDER
EFFECT KEY
DSK
FADE TO BLACK
PGM BUS VIDEO
PST BUS VIDEO
BORDER /EFF MATTE
KEY BUS VIDEO
DSK FILL VIDEO
C. SYNC
BORDER GATE
WIPE /MIX GATE
KILLER /BORDER HOLE
KEY HOLE
DSK HOLE
FTB
OUT
: EFFECT AMP
: CONTROL SIGNAL
: INPUT SIGNAL

Fig. 2-29

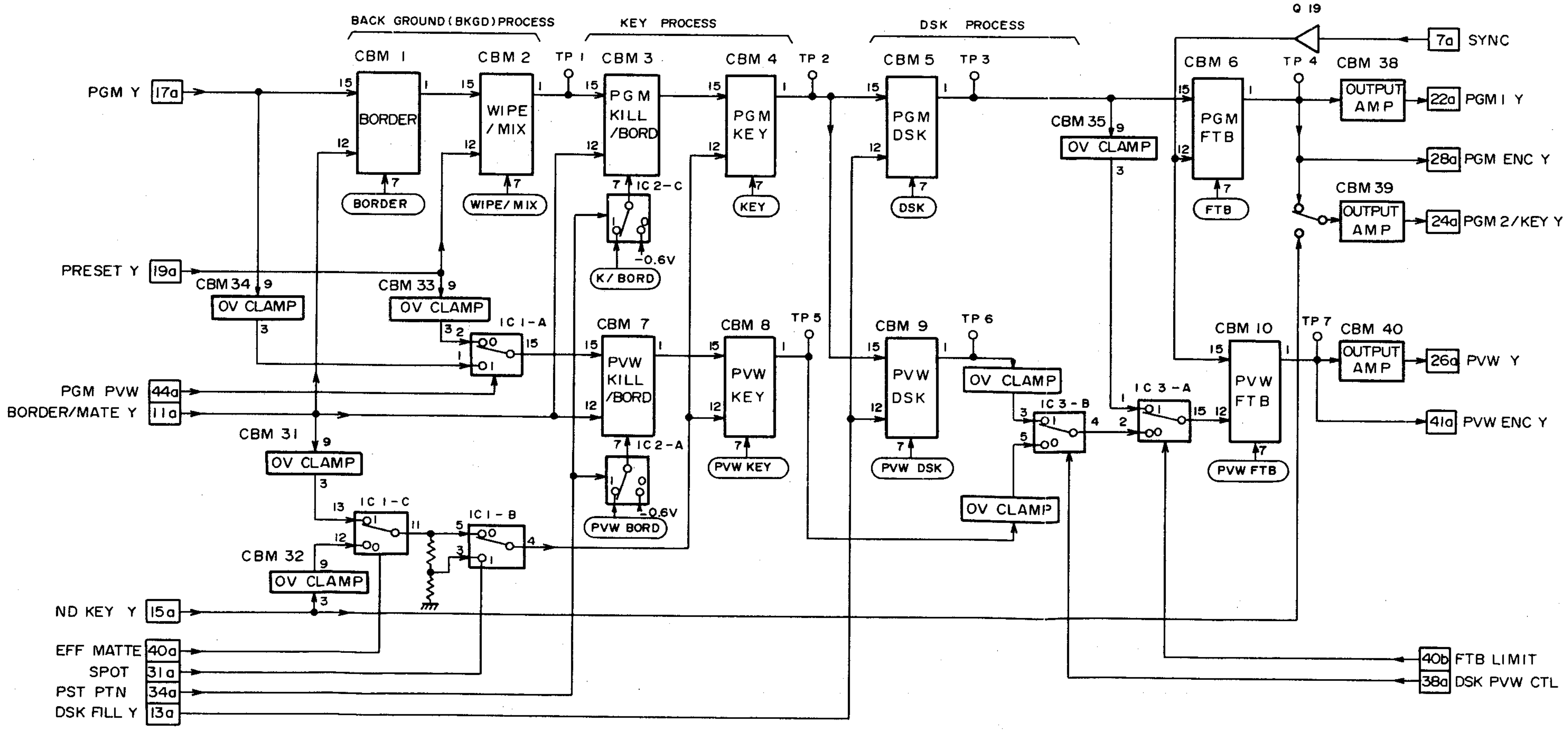

BACK GROUND (BKGD) PROCESS
KEY PROCESS
DSK PROCESS
PGM Y 17a
PRESET Y 19a
PGM PVW BORDER/MATE Y 44a 11a
ND KEY Y 15a
EFF MATTE 40a
SPOT 31a
PST PTN 34a
DSK FILL Y 13a
CBM 1 BORDER
CBM 2 WIPE /MIX
CBM 3 PGM KILL /BORD
CBM 4 PGM KEY
CBM 5 PGM DSK
CBM 6 PGM FTB
CBM 7 PVW KILL /BORD
CBM 8 PVW KEY
CBM 9 PVW DSK
CBM 10 PVW FTB
CBM 31 OV CLAMP
CBM 32 OV CLAMP
CBM 33 OV CLAMP
CBM 34 OV CLAMP
CBM 35 OV CLAMP
OV CLAMP
CBM 38 OUTPUT AMP
CBM 39 OUTPUT AMP
CBM 40 OUTPUT AMP
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP 7
Q 19
IC 1-A
IC 1-B
IC 1-C
IC 2-A
IC 2-C
IC 3-A
IC 3-B
BORDER
WIPE/MIX
K/BORD
KEY
DSK
FTB
PVW BORD
PVW KEY
PVW DSK
PVW FTB
-0.6V
7a SYNC
22a PGM 1 Y
28a PGM ENC Y
24a PGM 2/KEY Y
26a PVW Y
41a PVW ENC Y
40b FTB LIMIT
38a DSK PVW CTL

Fig. 2-30 Y signal effect amp

(1) Border amplifier

The border amplifier clips the PROGRAM BUS signal using the border gate signal, then inserts the border color signal (refer to 2.7.2) which is used for wipe effects.

The PROGRAM BUS signal input to CBM2 and the BORDER signal are fed to the CBM where their pedestal level is clamped to -4 V and are input to the dual balanced differential amplifier in the CBM.

Fig. 2-31 shows an equivalent circuit of the dual balanced differential amplifier. In the diagram, a constant current flows to the emitters of X5 and X6. However, the current flowing is varied by PGM Y and BORDER Y. The feedback voltage determined by PGM Y gain and BORDER Y gain controls is applied to the bases of X5 and X6 which adjust the output gain.

The border gate signal is applied to the bases of X1 and X4. The pedestal level of the border gate signal is clamped to -0.6 V before being input to the CBM. (The details will be given later.) If the voltage applied to X1 and X4 is less than -0.6 V, X1 and X4 are cut off and the signal flowing through the emitter of X5 is output. Namely, if the signal to be input to the emitter of X5 is the main input, the main input is output. Conversely, if the voltage applied is more than 0.6 V, X2 and X3 are cut off and the signal flowing through the emitter of X6 is output. If the signal input to X6 is a sub input, the sub input is output.

If the signal is between 0.6 and -0.6 V, the signals flowing through X5 and X6 are mixed before being output.

Therefore, if, as shown in Fig. 2-32, the border gate signal is input, the output will be a signal in which border Y signal is inserted in the PGM Y signal as shown in the diagram.

If the soft switch is ON, the leading and trailing edges of the border gate signal will be smoothed and the border edge will have the PGM Y and border Y signal mixed. This provides the soft effect.

The border effect output is sent to the wipe amplifier.

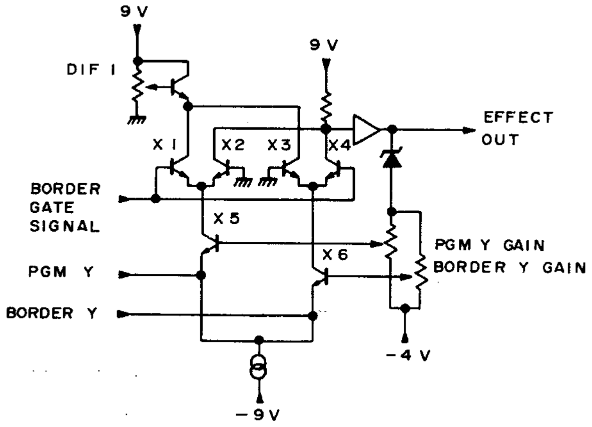

9V
9V
DIF I
X1
X2
X3
X4
X5
X6
EFFECT OUT
BORDER GATE SIGNAL
PGM Y
BORDER Y
PGM Y GAIN
BORDER Y GAIN
-4 V
-9V

Fig. 2-31

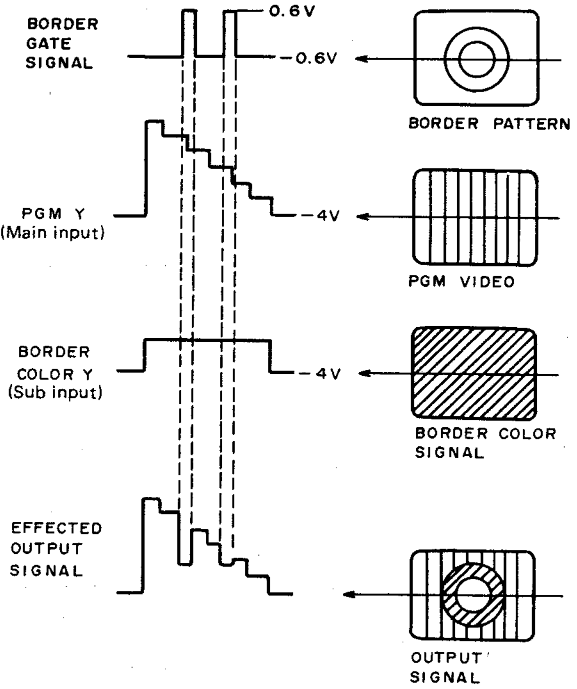

BORDER GATE SIGNAL
0.6V
-0.6V
BORDER PATTERN
PGM Y (Main input)
-4V
PGM VIDEO
BORDER COLOR Y (Sub input)
-4V
BORDER COLOR SIGNAL
EFFECTED OUTPUT SIGNAL
OUTPUT SIGNAL

Fig. 2-32

(2) Wipe amplifier

The wipe amplifier wipes/mixes the PROGRAM BUS signal and PRESET BUS signal. The principle is the same as that of the border amplifier.

The input signal is selected by the border amp output and the PRESET BUS. The clipping signal (control signal) is the wipe/mix gate signal. The effect output is sent to the color killer/border amp.

(3) Color killer/border amp

If the chroma key is selected as a key source using the effect keyer, this amp serves as a color killer amp whereas if the PST PTN is selected, it serves as a border amp. The amp is separated into the PGM (main bus) channel and the PVW (preview) channel.

If it functions as a border amp, it is the same as (1) above. The main input is the wipe amp output in the case of the PGM channel and the sub input is the BORDER signal. The BORDER signal is the same as the signal to be input to the BORDER amp (1) above. The control signal is the BORDER keyhole signal generated on the KEY circuit board. Either the PROGRAM BUS video signal or PRESET BUS video signal is input to the PVW channel amp as the main input. If the BKGD button on the control panel is pressed, the PRESET BUS video signal is input whereas if the KEY button is pressed, IC1-A is switched by the PGM PVW signal from the CPU circuit board and the PROGRAM BUS video signal is input. If the BKGD and KEY buttons are pressed simultaneously, the PRESET BUS video signal is input.

When the amp functions as a color killer amp, the principle is the same as in (1) above. But, for details, refer to the description of "2.8.3 Linear key circuit".

(4) Effect key amp

The effect key amp performs the keying set by the EFFECT KEYER controls on the panel.

The output video signal from (3) color killer/border amp is clipped by various keyhole signals from the KEY circuit board then the video signal selected by the KEY BUS is inserted. The KEY BUS video signal is switched over to the color matte signal (same as the BORDER signal) by IC1-C when the EFF MATTE is ON. The signal which switches IC1-C is the EFF MATTE signal from the CPU circuit board. If the SPOT button on the panel is pressed, the SPOT signal from the CPU circuit board goes high and switches IC1-B. If it is switched, the level of the KEY BUS video signal or effect matte signal is halved by resistors. However, this is only applied to the Y signal, and there are no corresponding switches for the R-Y and B-Y signals. This provides the spotlight effect.

The effect key amp has PGM and PVW (preview) channels; their principle is the same as given in (1) above and it is not described here.

The output from the effect key amp is the main input to the DSK amp.

(5) DSK amp

The DSK amp provides a DSK effect. The principle of the amp is the same as (1) above. The output from the effect key amp is clipped by the DSK hole generated by the KEY circuit board then it is inserted into the DSK fill picture selected by the KEY circuit board. The DSK amp has a PGM channel and PVW channel. The output from the PGM channel is sent to the PGM FTB (fade out) amp. The output from the PVW channel is switched over to the output from the PVW key amp by IC3-B when the DSK PVW button is ON before being input to the PVW channel FTB amp. The signal which switches IC3-B is the DSK PVW CTL signal from the CPU circuit board.

(6) FTB (fade to black, fade out) amp

The FTB amp performs fade out and sync switching. The principle of the amp is the same as the description in (1) above. The amp is separated into the PGM channel and PVW channel.

The main input to the PGM channel is the output from the PGM DSK amp and the sub input is a composite sync signal sent from the SG circuit board. The control signal is the FTB signal to be described later.

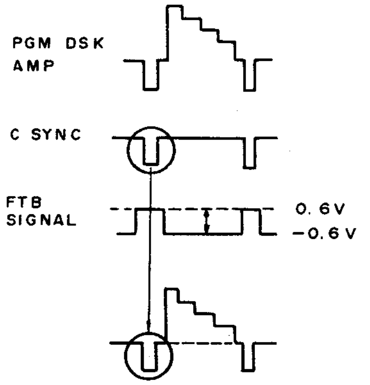


Fig. 2-33

As the FTB signal has a level of +0.6 V during the blanking period, the CSYNC signal is output during this period. When the FADE TO BLACK button is pressed, fade out starts. When the fade out is started and during the picture period of the FTB signal, the level is -0.6 V and the signal from the PGM DSK amp is output. During the fade out period, as the level varies between -0.6 V and +0.6 V, the signal is mixed with the pedestal of the C. SYNC signal. Upon completion of the fade out period, the FTB signal becomes 0.6 V and only the C. SYNC signal is output.

When the FADE TO BLACK button is pressed again, fade is started and FTB level varies between +0.6V and -0.6V.

In the PVW channel FTB amp, the main input and the control signal are different from those of the PGM channel.

When the fade out period starts, the main input video signal is the output from the PVW DSK or PVW KILL/BORD amp. The moment the fade out period is complete, the FTB LIMIT signal from the CPU circuit board goes high and is switched over to the output from the PGM DSK amp by IC3-A. When the release of the FTB (fade in) is complete, FTB LIMIT goes low again and the same signal as during starting is input.

The control signal of PVW channel has a level of 0.6 V during the blanking period and the C. SYNC is the amp's output. However, during the video period, it is at -0.6 V at all times and the main input video will be the amp's output.

The output of the PGM FTB amp is separated into three channels. One channel is sent to the BNC circuit board as a main bus channel video signal to be output from the PGM1 Y/R-Y/B-Y OUT connectors on the rear panel. Another channel is sent to the KSG circuit board and is used to form the COMPOSITE PGM OUT signal. The last channel is sent to the BNC circuit board as the PGM2 Y/R-Y/B-Y OUT; however, if a connector is replaced, the ND KEY Y/R-Y/B-Y (video selected by the KEY BUS) is sent to these connectors.

The output from the PVW FTB amp is branched into two channels; one channel is sent to the BNC circuit board as the preview channel video signal to be output from PVW Y/R-Y/B-Y OUT on the rear panel and the other channel is sent to the KSG circuit board and becomes the COMPOSITE PVW OUT signal.

2.8.2 Control signal generator circuit

Control signals are used to clip the video signal in each amp. The block diagram of the control signal generator circuit is given in Fig. 2-34.

(1) Border gate signal

The BORDER gate signal controls the BORDER amp. This signal is produced by clamping the BORDER gate signal generated by the KEY circuit board to -0.6 V during the blanking period. When the MIX button is pressed, IC11-A is switched by the MIX/WIPE and fixed at -0.6 V and the BORDER amp outputs the main input. When BKGD is not pressed, IC11-B is switched over to -0.6 V by the BKGD NEXT and the main input is output.

(2) Wipe/mix gate signal

The wipe/mix gate signal controls the wipe/mix amp.

This signal is produced by clamping the wipe gate signal generated by the KEY circuit board to -0.6 V during the blanking period if the WIPE button is pressed.

When the MIX button is pressed, a fader voltage of 0 to 5 V D/A-converted on the MT circuit board and DC-shifted to -0.6 V to +0.6 V by IC9 before the blanking period in which the signal level is -0.6 V, is mixed by IC11-C.

(3) Color killer/border hole signal

The color killer/border hole signal controls the color killer/border amp.

This signal is produced by clamping the signal level in the blanking period of the color killer/border hole signal generated by the KEY circuit board to -0.6 V.

The signal for the PVW channel amp is clamped before being input to analog switch IC12-A. The analog switch is switched by the KEY PVW from the CPU circuit board. If the KEY button is pressed when the KEY ON lamp on the panel is not lit, it goes high and the control signal is sent to the PVW amp. If the KEY button is pressed when the KEY ON lamp is not lit, it goes low, a -0.6 V signal is sent to the PVW amp and the amp outputs the main input.

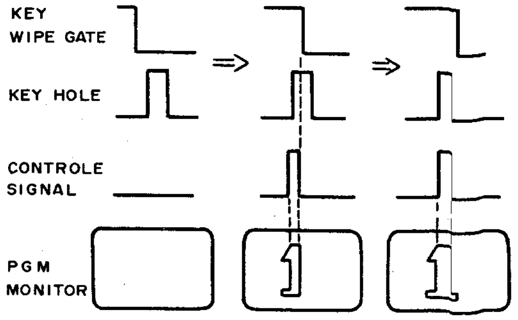


Fig. 2-35

In the case of the PGM channel amp, the signal is clamped before being masked by CBM65. If the keying set by the EFFECT KEYER on the panel is to be sent to the main bus in a mix effect, the fader voltage is a masking signal, whereas if it is sent in a wipe effect, the key wipe gate signal is a masking signal.

As described in 2.6.2 (5), the fader voltage reverts from 5 V to 0 V when keying is complete. Therefore, the moment mixing is complete, the KEY STATE goes high and the fader voltage is inverted, maintaining the KEY ON state.

Analog switch IC14-C immediately before the CBM is provided for masking. This switch maintains the fader voltage of the KEY mode during the BKGD mode. During the BKGD mode, the KEY NEXT signal goes low and the DC-shifted KEY STATE signal is input to the masking circuit, which maintains the key on or off state.

(4) Effect keyhole signal

The effect keyhole signal controls the effect key amp. This signal is produced by clamping the blanking period of the key/wipe keyhole signal generated by the KEY circuit board to -0.6 V. Apart from this, it the same as (3) color killer/border hole signal so it is not described here.

(5) DSK hole signal

The DSK hole signal controls the DSK amp.

This signal is produced by clamping the blanking level of the DSK PVW hole or DSK hole signal to -0.6 V.

(6) FTB control signal

The FTB control signal controls the FTB amp.

A signal produced by mixing -0.6 V blanking level with the B fader voltage D/A-converted on the MT circuit board is sent to the PGM FTB amp.

The 0.6 V signal in the blanking period is sent to the PVW FTB during the video period.

2.8.3 Linear key circuit

The linear key circuit performs chroma keying. Compared with hard keying of previous models KM-2000 and KM-1200 or conventional soft keying, this circuit provides more natural keying.

In the previous chroma key circuit, for example, as the leading edge and trailing edge of the key hole signal were smoothed at parts of the picture with smoke from a factory chimney or a person's shadow, the key fill picture (landscape, etc.) was mixed with the blue background, so clear keying was not possible. (Bluish shadows or smoke were mixed with the landscape.)

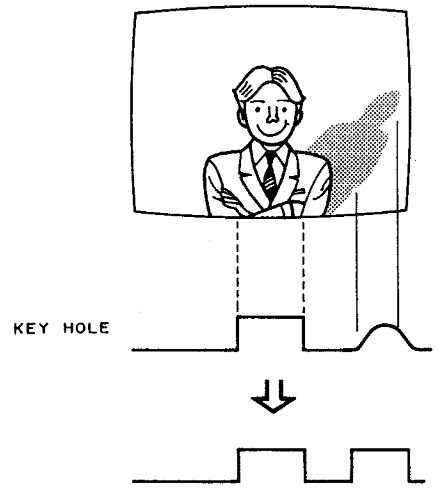
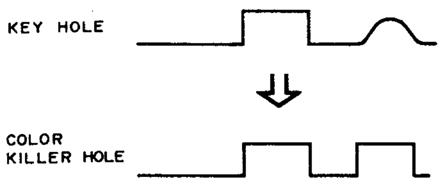


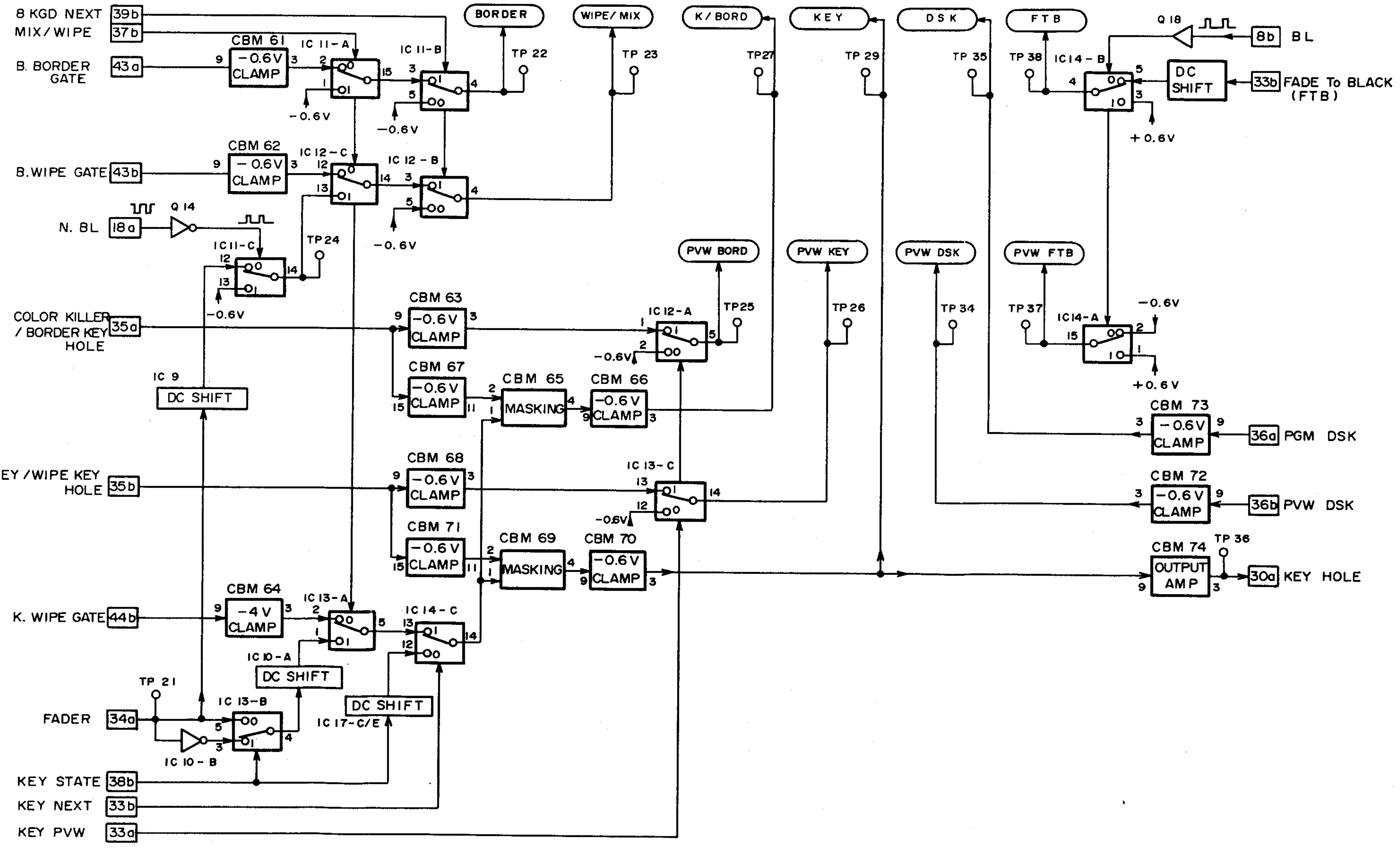
Fig. 2-36

To solve this, the KM-3000 generates two types of keyholes. One keyhole is the same as the one obtained by the same process as in conventional chroma keying. The other is a color killer hole. In contrast to the previous keyhole, this waveform is obtained by increasing the gain of a VCA as described in 2.7.1 (2). For example, as the part of the video signal with smoke and shadows has high gain, even a section with a low level would be recognized as a keyhole.



KEY HOLE
COLOR KILLER HOLE

Fig. 2-37



BKGD NEXT 39b
MIX/WIPE 37b
B. BORDER GATE 43a
B.WIPE GATE 43b
N. BL 18a
Q14
COLOR KILLER / BORDER KEY HOLE 35a
KEY/WIPE KEY HOLE 35b
K. WIPE GATE 44b
FADER 34a
KEY STATE 38b
KEY NEXT 33b
KEY PVW 33a
CBM 61 -0.6V CLAMP
CBM 62 -0.6V CLAMP
CBM 63 -0.6V CLAMP
CBM 64 -4V CLAMP
CBM 65 MASKING
CBM 66 -0.6V CLAMP
CBM 67 -0.6V CLAMP
CBM 68 -0.6V CLAMP
CBM 69 MASKING
CBM 70 -0.6V CLAMP
CBM 71 -0.6V CLAMP
CBM 72 -0.6V CLAMP
CBM 73 -0.6V CLAMP
CBM 74 OUTPUT AMP
IC 11-A
IC 11-B
IC 11-C
IC 12-A
IC 12-B
IC 12-C
IC 13-A
IC 13-B
IC 13-C
IC 14-A
IC 14-B
IC 14-C
IC 9 DC SHIFT
IC 10-A DC SHIFT
IC 10-B
IC 17-C/E DC SHIFT
DC SHIFT
-0.6V
+0.6V
BORDER
WIPE/MIX
K/BORD
KEY
DSK
FTB
PVW BORD
PVW KEY
PVW DSK
PVW FTB
TP 21
TP 22
TP 23
TP 24
TP25
TP26
TP27
TP 29
TP 34
TP 35
TP37
TP 38
TP 36
Q18
8b BL
33b FADE To BLACK (FTB)
36a PGM DSK
36b PVW DSK
30a KEY HOLE

Fig. 2-34

1-36

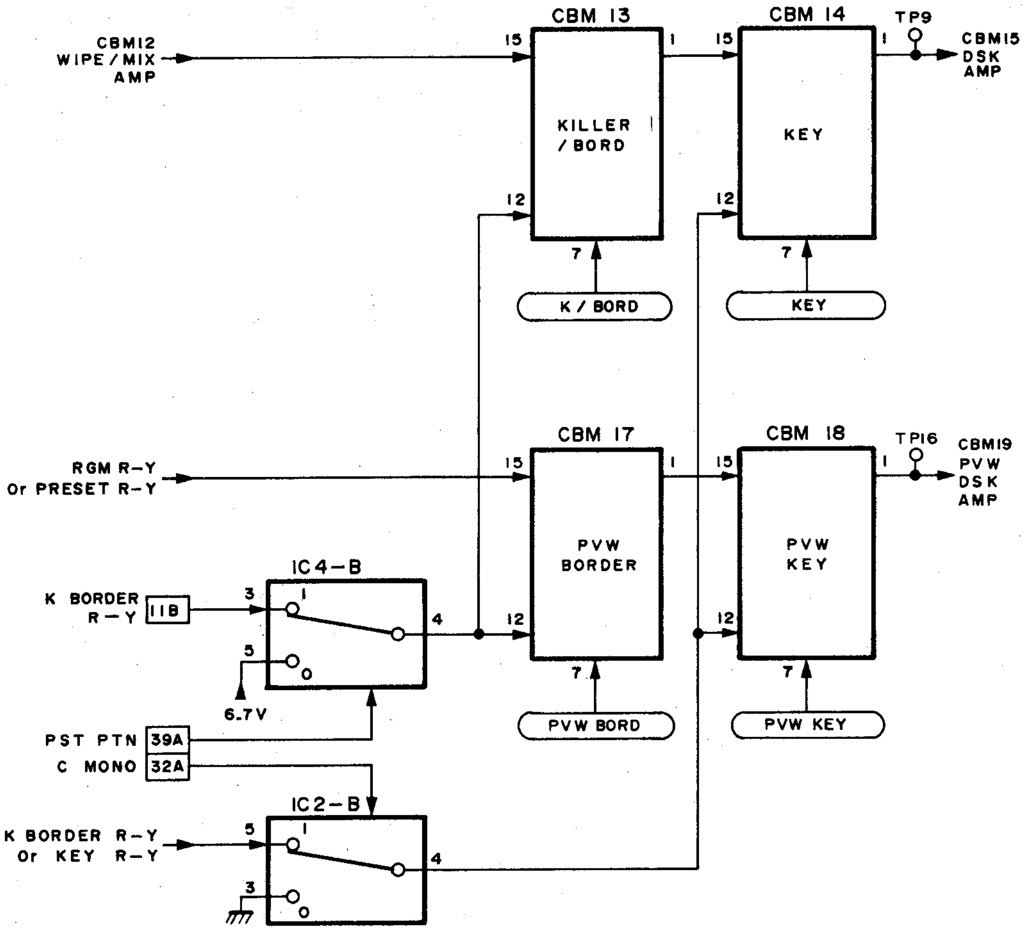

CBM 13
CBM 14
TP9
CBM12
WIPE / MIX
AMP
15
1
15
1
CBM15
DSK
AMP
KILLER
/ BORD
KEY
12
12
7
7
K / BORD
KEY
CBM 17
CBM 18
TP16
CBM19
PVW
DSK
AMP
RGM R-Y
Or PRESET R-Y
15
1
15
1
PVW
BORDER
PVW
KEY
IC4-B
K BORDER
R-Y
11B
3
1
4
12
12
5
0
6.7V
7
7
PVW BORD
PVW KEY
PST PTN
39A
C MONO
32A
IC2-B
K BORDER R-Y
Or KEY R-Y
5
1
4
3
0

Fig. 2-38 R-Y signal effect amp.

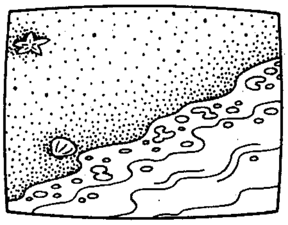


Fig. 2-39

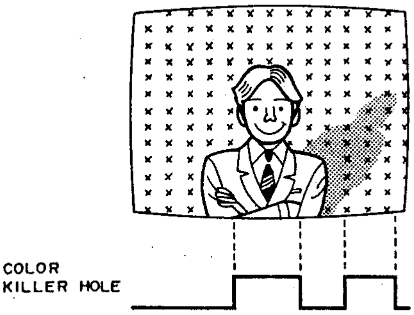

COLOR
KILLER HOLE

Fig. 2-40

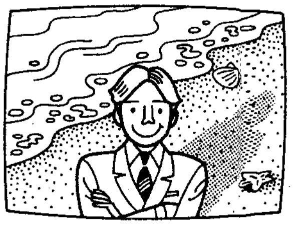


Fig. 2-41

As an example, let us think about the chroma keying of the blue background picture as shown in Fig. 2-36 with the landscape shown in Fig. 2-39. In the case of the KM-3000, the blue background picture is selected by the PROGRAM BUS and the landscape is selected by the KEY BUS. Namely, the blue background portion is cut out from the blue background picture then the signal selected by the KEY BUS (landscape, etc.) is fitted in.

Assuming that neither BORDER or wipe is to be performed, the blue background picture will be the main input to the color killer amp. Refer to the amplifier block diagram of the Y signal in Fig. 2-30 and the amplifier block diagram of the R-Y signal in Fig. 2-38. (In Fig. 2-38, only the portion which is different from Fig. 2-30 is shown. The B-Y circuit has the same configuration as the R-Y circuit.) At this time, the control signal becomes the color killer hole; however this is only fed to the R-Y/B-Y amps. The control signal for Y is cut by IC2-C/IC-2A. Therefore, although the Y signal is output, the high portion of the color killer hole of the R-Y/B-Y signal is replaced by the sub input. The sub input is switched from the BORDER color signal to a black signal by IC4-B. Therefore, in the video signal passed through the color killer amp, the blue background portion, the shade portion will consist of only Y signals.

Next, this is input as a main input to the effect key amp.

At this time, the control signal is the previous keyhole and this keyhole cuts picture shown in Fig. 2-41. And the sub input is the video signal selected by the KEY BUS and fills the hole with the result that the picture shown in Fig. 2-41 is produced.

At this time, as the overlapped portion of the landscape and shade portion is processed by the conventional keyhole, the edge becomes soft and is not tinted with the blue background color. In this way, more natural chroma keying is made possible.

2.9 KSG CIRCUIT BOARD

The KSG circuit board is responsible for the input/output of the signals between the SG circuit board and the MT circuit board and includes the following circuits.

1. Program output composite encoder
2. Preview output composite encoder
3. Color bars generator

The signals output from the SG circuit board to the MT circuit board through this circuit board include the BFP, C.SYNC. CP, C.BL, HD and VD. The signals to be input to the SG circuit board are the reference signals (VBS, B.B) for use in genlocking.

2.9.1 Program output composite encoder

The composite signal is produced from the program output PGM ENC Y/R-Y/B-Y signal components output from the VIDEO circuit board. At the same time, the PGM Y/C output and black burst signals (B.B1 to B.B3) are also output. The block diagram is given in Fig. 2-42.

(1) Composite output

The sync level of the PGM ENC Y signal is adjusted by R34 before being passed through DL1 and mixed with the chroma signal. Although the sync level is adjusted to 0.3 V by the VIDEO circuit board (as this is the level of the component output), it is readjusted to 0.286 V for use in the composite signal. The chroma signal to be mixed is obtained by modulating of the PGM ENC R-Y/B-Y signals using

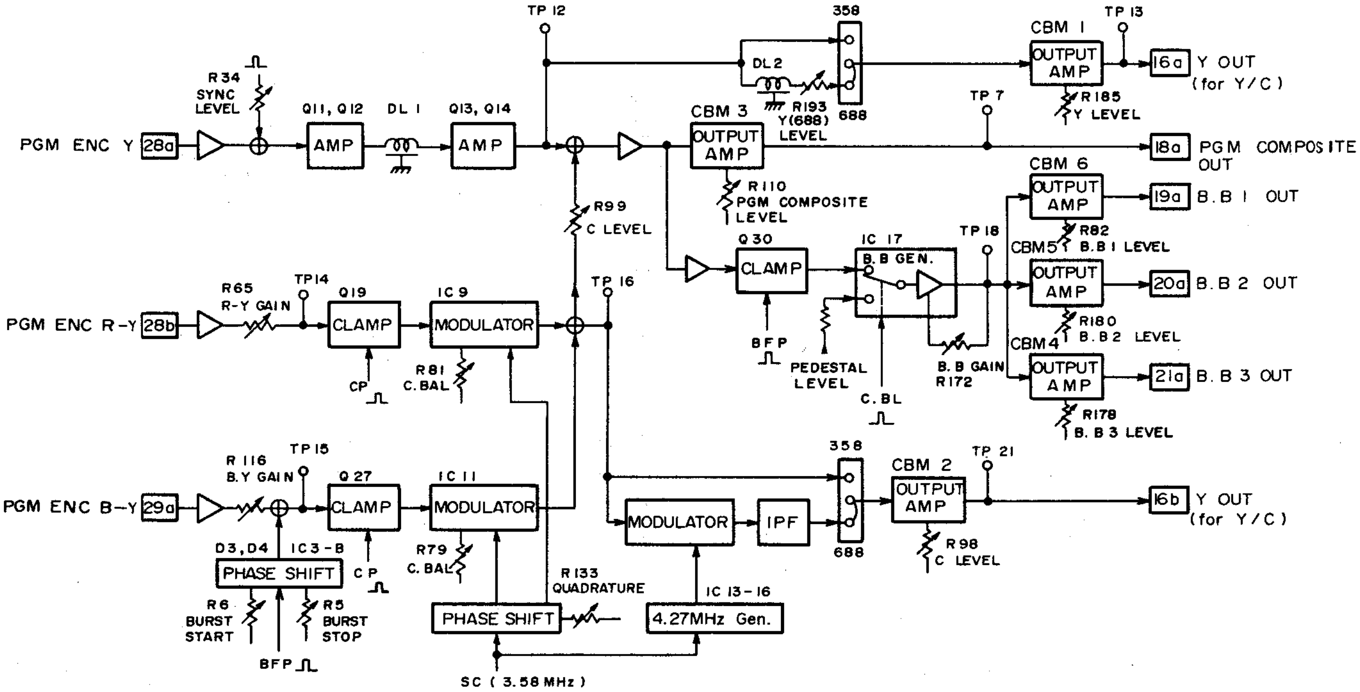

PGM ENC Y
28a
R34
SYNC
LEVEL
Q11, Q12
AMP
DL 1
Q13, Q14
AMP
TP 12
R99
C LEVEL
TP 16
PGM ENC R-Y
28b
R65
R-Y GAIN
TP14
Q19
CLAMP
IC 9
MODULATOR
CP
R81
C.BAL
PGM ENC B-Y
29a
R 116
B.Y GAIN
TP15
Q 27
CLAMP
IC 11
MODULATOR
D3, D4
IC3-B
PHASE SHIFT
CP
R79
C.BAL
R6
BURST
START
R5
BURST
STOP
BFP
R 133
QUADRATURE
PHASE SHIFT
SC (3.58 MHz)
MODULATOR
IC 13-16
4.27MHz Gen.
IPF
358
688
CBM 2
OUTPUT
AMP
TP 21
R98
C LEVEL
16b
Y OUT
(for Y/C)
DL2
R193
Y(688)
LEVEL
358
688
CBM 3
OUTPUT
AMP
R110
PGM COMPOSITE
LEVEL
CBM 1
OUTPUT
AMP
TP 13
R185
Y LEVEL
16a
Y OUT
(for Y/C)
TP 7
18a
PGM COMPOSITE
OUT
Q30
CLAMP
BFP
IC 17
B.B GEN.
PEDESTAL
LEVEL
C.BL
B.B GAIN
R172
TP 18
CBM 6
OUTPUT
AMP
R82
B.B 1 LEVEL
19a
B.B 1 OUT
CBM5
OUTPUT
AMP
R180
B.B 2 LEVEL
20a
B.B 2 OUT
CBM4
OUTPUT
AMP
R178
B.B 3 LEVEL
21a
B.B 3 OUT

Fig. 2-42

the SC (3.58 MHz) and mixing them. 0.3 usec DL1 is provided to correct the phase delay of the chroma signal which occurs during modulation.

The level of the Y signal with which the chroma signal is mixed is adjusted to 1 Vp-p by CBM3 and is output from the rear panel as a composite signal.

(2) Y/C output

This outputs the Y signal and the chroma (C) signal before the are mixed to form a composite signal. Two chroma signal output modes, the 358 mode and the 688 mode, can be selected.

In the case of the 358 mode, both the Y and C signals are adjusted in level by output amps (CBM1 and CBM2) before being output. The frequency of the chroma signal is 3.58 MHz which conforms with the S-VHS standard.

In the case of the 688 mode, the chroma signal is modulated to 688 kHz using the 4.27 MHz carrier signal before being output. The Y signal passes through the 120 nsec delay line (DL2) which corrects the phase delay occurring at the time of modulating the chroma signal and is output. The 688 mode conforms with the 3/4-inch U-matic format. The 4.27 MHz carrier signal is generated by the method described below.

(3) 4.27 MHz oscillator

The 3.58 MHz SC (subcarrier) signal generated on the SG circuit board is counted down by a factor of 26 using binary counter IC14 (equivalent to counting down 4.27 MHz by a factor of 31).

The output from the 4.27 MHz VCO consisting of X1, IC16, etc. is compared with the SC counted down by a factor of 26. Flip-flop IC15 acts as a comparator. When the 4.27 MHz signal is stable, IC15 outputs a high level signal. This signal is integrated using CR (capacitors and resistors) and is used to control the VCO to provide a stable 4.27 MHz signal. The output from the VCO is shaped using ceramic filter CK1

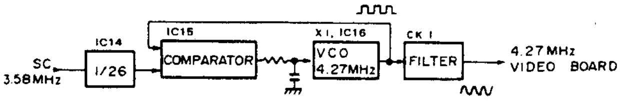


Fig. 2-43

(4) B.B (Black Burst) signal generator circuit

The composite signal output from the Y/C MIX circuit is passed through Q29, then clamped using the BURST. After this, the signal passes through Q31 and Q32, then is input to pin ③ of IC17. The C. BL signal is input to pin ⑧ of IC17 from the SG circuit board. IC 17 is a balanced modulator which outputs the C. SYNC and BFP for the composite signal during the C. BL period and outputs the black signal with the bias determined by R167 (PEDESTAL LEVEL) during the video period. CBM4 to CBM6 are output drivers, and the levels of the three channels are individually adjusted before being output.

2.9.2 Preview output composite encoder

The composite encoder of the preview output has the same circuit configuration as that of the program output and is not described here.

However, in this case, the Y/C signal and the black burst signal are not generated.

2.9.3 Color bars generator

Basically, the color bars generator is the same as the color bars generator in the KY-950B color camera.

The bars clock input from the SG circuit board is input to binary counter IC4 to obtain R/G/B color bars signals. These are converted into R-Y/Y/B-Y signals by transcoder IC5 to obtain component color bars signals. After sync is mixed from the Y component, the levels of these signals are independently adjusted before they are supplied to the CP circuit board.

2.10 SG circuit board

The circuit configuration of the SG circuit board is basically the same as the SG circuit board built into KY-950B/ KY-320B video cameras. However, electrical aprts and the circuit board itself are different and they are not compatible.
The SG circuit board has basically two functions: the SSG section generates various sync signals and the GENLOCK portion performs genlocking.

2.10.1 SSG section

1. NTSC version
As an SSG IC, a CMOS-structured 44-pin flat pack IC is used. There are two clock oscillators which generate H and V sync signals: 4 fsc clock oscillator and 910 fh clock oscillator. These are used to provideo external sync.
In the case of the internal sync mode, as the H and V sync pulses are produced by counting down the 4 fsc signal, interleaved sync signals can be obtained.
In the ecternal genlocking mode, these clock oscillators are phase-controlled by the external SC and external SYNC pulses respectively.
The timing chart of primary sync signals output from the SG circuit board is given on the following page.

2. PAL version
The color bar primary signal generator is built into a C-MOS type 44-pin flat package LSI.
There is a clock oscillator used to generate the TV synchronizing signal 282 fh for externfal synchronization. The relation ship between subcarrier and phase/frequency of 282 fh clock oscillator is, based on the standard for PAL-B, as follows:

PAL-B: fsc = (284 – 1/4) fh + 25 Hz

This formula is changed as follows, so that the relation between fsc and fh is always fixed in SSG of this camera.

fsc-25 Hz = 1135 x 1/4 fh

From each of pin 10 19 of IC18 25 Hz with a 90 degree phase difference is output. In IC19 and IC20, fsc is phase-modulated at 25 Hz, fsc-25 Hz is taken out and is input to pin 9, 10 of IC21
Meanwhile the output of IC1, 1/4 fh pulse, becomes a narrow gate pulse of about the width of 50 nsec. at pin 2 of IC18.
At FET gate of IC21 the voltage relating deviation of phase of fsc-25 Hz is detected by phase of 1/4 fh gate pulse.
This voltage, representing the phase variation, controls the CK frequency (282 fh) oscillator X'TAL-3.
LSI IC1 counts down the 282 fh, and generates necessary synchronizing signals.
IC11 counts down 4 fsc and outputs fsc and 1/4 fsc for zebra indication on the viewfinder.
The timing chart of promary sync signals output from the SG circuit board is given on the following page.

2.10.2 GENLOCK section

Refer to the section 1 of KY-950B Service Manual No. 6438.

1H ≒ 63.55 μ sec
1 T = H/910 ≒ 69.84 n sec
1 V = 525H/2 ≒ 16.6 m sec

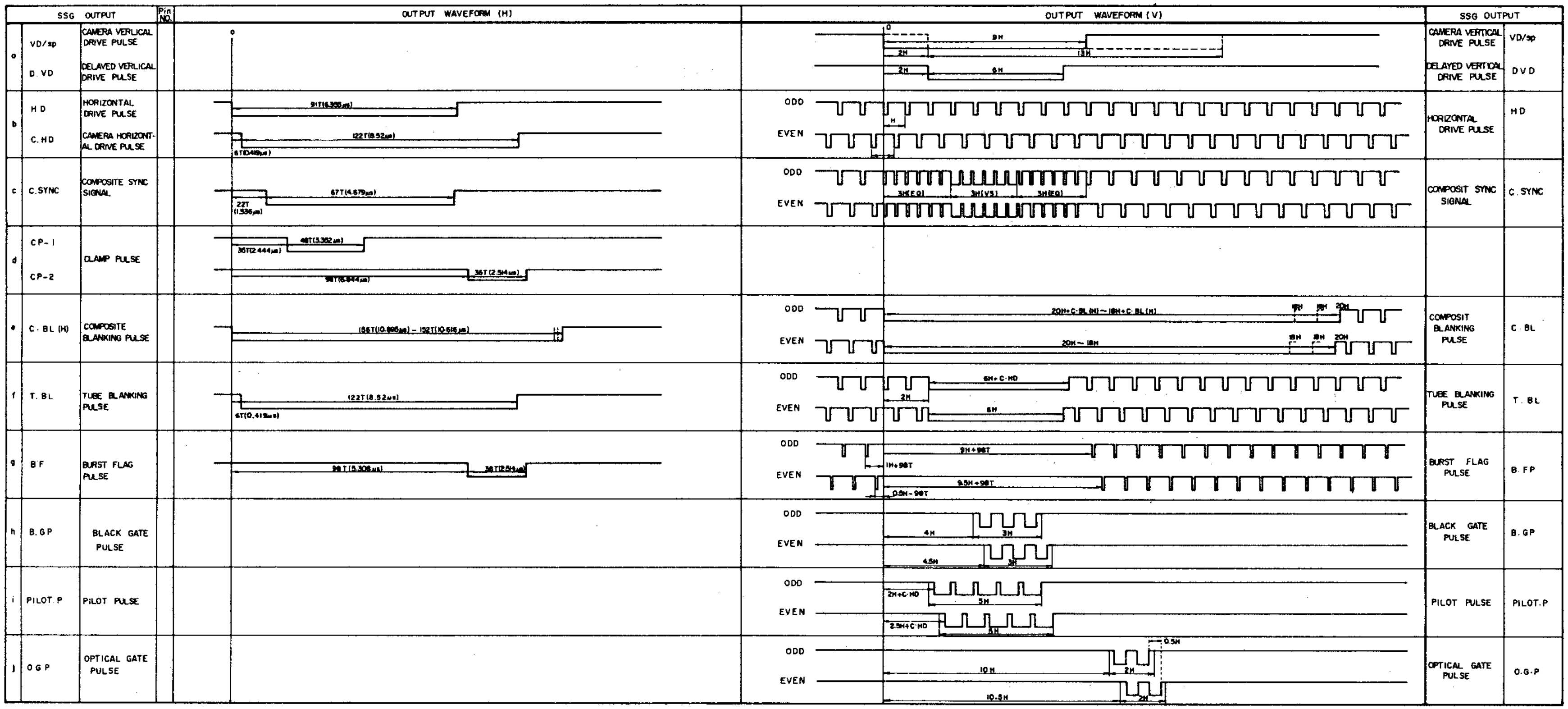

SSG OUTPUT
Pin NO.
OUTPUT WAVEFORM (H)
OUTPUT WAVEFORM (V)
SSG OUTPUT
a
VD/sp
CAMERA VERLICAL DRIVE PULSE
D. VD
DELAVED VERLICAL DRIVE PULSE
0
2H
9H
13H
2H
6H
CAMERA VERTICAL DRIVE PULSE
VD/sp
DELAYED VERTICAL DRIVE PULSE
DVD
b
HD
HORIZONTAL DRIVE PULSE
C. HD
CAMERA HORIZONTAL DRIVE PULSE
91T(6.355μs)
122T(8.52μs)
6T(0.419μs)
ODD
EVEN
H
HORIZONTAL DRIVE PULSE
HD
c
C.SYNC
COMPOSITE SYNC SIGNAL
22T (1.536μs)
67T(4.679μs)
3H(EQ)
3H(VS)
3H(EQ)
COMPOSIT SYNC SIGNAL
C. SYNC
d
CP-1
CP-2
CLAMP PULSE
36T(2.444μs)
48T(3.352μs)
98T(6.844μs)
36T(2.514μs)
e
C・BL (H)
COMPOSITE BLANKING PULSE
156T(10.895μs) – 152T(10.616μs)
20H+C・BL (H) ~ 18H+C・BL (H)
18H
19H
20H
20H ~ 18H
COMPOSIT BLANKING PULSE
C. BL
f
T. BL
TUBE BLANKING PULSE
122T(8.52μs)
6T(0.419μs)
6H+C・HD
2H
6H
TUBE BLANKING PULSE
T. BL
g
BF
BURST FLAG PULSE
98T(5.308μs)
36T(2.514μs)
9H+98T
1H+98T
9.5H+98T
0.5H-98T
BURST FLAG PULSE
B. FP
h
B.GP
BLACK GATE PULSE
4H
3H
4.5H
3H
BLACK GATE PULSE
B. GP
i
PILOT.P
PILOT PULSE
2H+C・HD
5H
2.5H+C・HD
5H
PILOT PULSE
PILOT.P
j
OGP
OPTICAL GATE PULSE
0.5H
10H
2H
10.5H
2H
OPTICAL GATE PULSE
O.G.P

Fig. 2-44-1 (NTSC version)

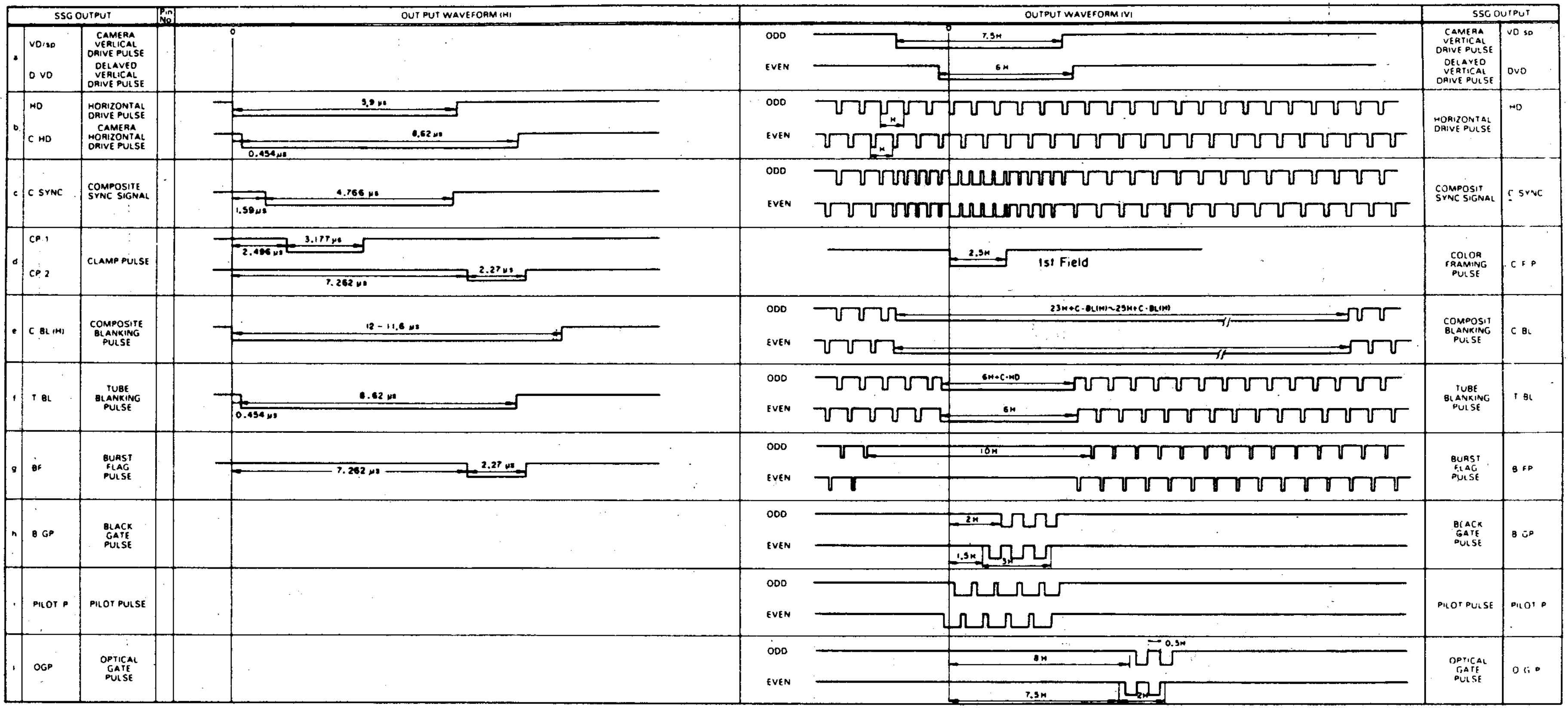

SSG OUTPUT
Pin No
OUT PUT WAVEFORM (H)
OUTPUT WAVEFORM (V)
SSG OUTPUT
a
VD/sp
CAMERA VERLICAL DRIVE PULSE
D VD
DELAVED VERLICAL DRIVE PULSE
b
HD
HORIZONTAL DRIVE PULSE
C HD
CAMERA HORIZONTAL DRIVE PULSE
c
C SYNC
COMPOSITE SYNC SIGNAL
d
CP 1
CP 2
CLAMP PULSE
e
C BL (H)
COMPOSITE BLANKING PULSE
f
T BL
TUBE BLANKING PULSE
g
BF
BURST FLAG PULSE
h
B GP
BLACK GATE PULSE
i
PILOT P
PILOT PULSE
j
OGP
OPTICAL GATE PULSE
0
5,9 μs
8,62 μs
0.454 μs
4.766 μs
1.59 μs
3.177 μs
2.496 μs
2.27 μs
7.262 μs
12 – 11,6 μs
8.62 μs
0.454 μs
7.262 μs
2.27 μs
ODD
EVEN
0
7.5H
6H
H
H
2.5H
1st Field
23H+C·BL(H)～25H+C·BL(H)
6H+C·HD
6H
10H
2H
1.5H
3H
0.5H
8H
7.5H
2H
CAMERA VERTICAL DRIVE PULSE
VD sp
DELAYED VERTICAL DRIVE PULSE
DVD
HORIZONTAL DRIVE PULSE
HD
COMPOSIT SYNC SIGNAL
C SYNC
COLOR FRAMING PULSE
C F P
COMPOSIT BLANKING PULSE
C BL
TUBE BLANKING PULSE
T BL
BURST FLAG PULSE
B FP
BLACK GATE PULSE
B GP
PILOT PULSE
PILOT P
OPTICAL GATE PULSE
O G P

Fig. 2-44-2 (PAL version)

2.11 CPU CIRCUIT BOARD

The CPU circuit board performs serial communications between the control unit and main unit and sends control signals to various circuit boards in the main unit. It also performs serial communications with external editors.

The CPU processes and executes this using the software held in ROM chips. The block diagram of the CPU circuit board is given in Fig. 2-45.

Although the configuration of the circuitry associated with the CPU is virtually the same as that on the DI circuit board in the control unit, it is used differently. As opposed to the DI circuit board which is primarily responsible for data acquisition and display control on the control panel, the CPU circuit board is responsible for controlling the operation of various circuit boards in the main unit. Therefore, the functions of the PIO (parallel input/output interface) and CTC (counter and timer circuit) are different. For the GPI input and TALLY output, a single PIO is added.

In this section, only the portions which are different from the DI circuit board are described.

2.11.1 CTC function

On the DI circuit board, the CTC accepts interrupts from the key matrix circuit and pulse encoder. On the CPU circuit board, interrupts are supplied to the CPU for every field.

VD is used to supply interrupt inputs. When VD is input, the CTC requests an interrupt to the CPU. If the CPU is not processing other interrupts at this time, the CPU sends an interrupt acknowledge signal to the CTC. When an interrupt has been acknowledged, the CTC makes the EIO terminal active in order to inhibit SIO interrupts. The SIO in turn inhibits PIO interrupts from the GPI input.

Once the CPU accepts an interrupt from the CTC, it rewrites the data at the output port of the PIO in accordance with the information from the control unit. The data at the output ports of the PIO are operation control signals for each circuit board in the main unit.

In other words, the operation of the main unit is controlled synchronized to the VD and control signals are written during the VD period.

2.11.2 Function of the PIO (1)

4-ganged PIO IC19 to IC22 are the same ICs as those of the PIO on the DI circuit board. For an outline of their operation, refer to 1.4.5.

The signals input to and output from the PIO are different from those on the DI circuit board and the input/output signals are given in Table 2-6.

All the output signals pass through a buffer before being sent to the various circuit boards; those flagged with * in the table are latched prior to being passed through buffers. IC2, IC4, IC6, IC8, IC11 and IC13 are latch ICs. The latched data is rewritten in every VD.

The output signals (non-latched signals) which are passed directly through the buffer are rewritten synchronized to the VD as described previously.

2.11.3 Function of the PIO (2)

IC34 is a PIO exclusively for the GPI inputs and TALLY outputs. Upon receipt of an input from the GPI terminal, IC43 requests an interrupt to the CPU unless the CTC or SIO is requesting an interrupt.

When the CPU receives a request, it performs processing in accordance with the input GPI signal. IC43 also accepts FLL and FLH fader limit signals generated on the WF circuit board and requests interrupts to the CPU.

TALLY signals are output following instructions from the CPU.

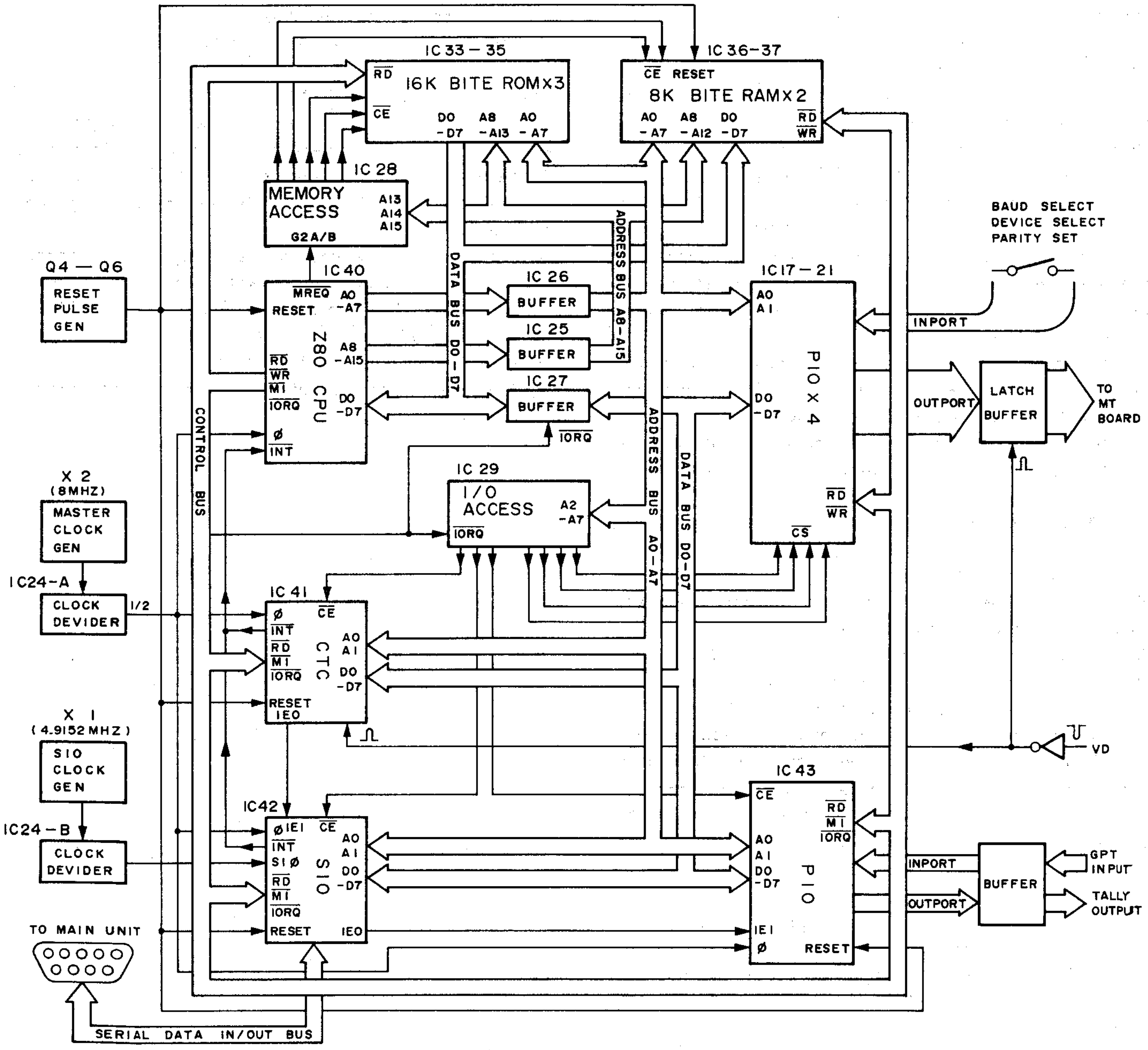

IC 33 — 35
16K BITE ROMx3
RD
CE
DO -D7
A8 -A13
AO - A7
IC 36-37
CE RESET
8K BITE RAMx2
AO - A7
A8 - A12
DO - D7
RD
WR
IC 28
MEMORY ACCESS
A13
A14
A15
G2A/B
ADDRESS BUS A8-A15
DATA BUS DO-D7
BAUD SELECT
DEVICE SELECT
PARITY SET
Q4 — Q6
RESET PULSE GEN
IC 40
MREQ
RESET
AO -A7
A8 -A15
RD
WR
MI
IORQ
DO -D7
Ø
INT
Z80 CPU
IC 26
BUFFER
IC 25
BUFFER
IC 27
BUFFER
IORQ
IC17 — 21
AO
A1
DO -D7
PIO x 4
RD
WR
CS
INPORT
OUTPORT
LATCH BUFFER
TO MT BOARD
CONTROL BUS
ADDRESS BUS AO-A7
DATA BUS DO-D7
X 2
(8MHZ)
MASTER CLOCK GEN
IC24-A
CLOCK DEVIDER
1/2
IC 29
I/O ACCESS
A2 -A7
IORQ
IC 41
Ø
CE
INT
RD
MI
IORQ
RESET
IEO
AO
A1
DO -D7
CTC
X 1
(4.9152 MHZ)
SIO CLOCK GEN
IC24 - B
CLOCK DEVIDER
VD
IC 43
CE
RD
MI
IORQ
AO
A1
DO -D7
IEI
Ø
RESET
PIO
IC42
ØIEI
CE
INT
SIØ
RD
MI
IORQ
RESET
IEO
AO
A1
DO -D7
SIO
INPORT
OUTPORT
BUFFER
GPT INPUT
TALLY OUTPUT
TO MAIN UNIT
SERIAL DATA IN/OUT BUS

Fig. 2-45

IC	PORT No.	IN/OUT	CONNECTED PCB	SIGNAL NAME	
IC29 (a)	a PA 0	OUT	CP	PGM SEL D0	BUS SELECT
	1			PGM SEL D1	
	2			PGM SEL D2	
	3			PGM SEL D3	
	4			PST SEL D0	
	5			PST SEL D1	
	6			PST SEL D2	
	7			PST SEL D3	
	a PB 0		CP	KEY SEL D0	
	1			KEY SEL D1	
	2			KEY SEL D2	
	3			KEY SEL D3	
	4		–	UNUSED	
	5		VIDEO KEY	DSK PVW CTL	
	6		KEY	C MONO	
	7		VIDEO WF	KEY STATE	
	a PC 0		WF	WIPE CODE D0	
	1			WIPE CODE D1	
	2			WIPE CODE D2	
	3			WIPE CODE D3	
	4			WIPE CODE D4	
	5			WIPE CODE D5	
	6			WIPE CODE D6	
	7			WIPE CODE D7	
IC20 (b)	b PA 0	OUT	WF	SOFTNESS D0	
	1			SOFTNESS D1	
	2			SOFTNESS D2	
	3			SOFTNESS D3	
	4		KEY	KEY EDGE SEL D0	
	5			KEY EDGE SEL D1	
	6		–	UNUSED	
	7		VIDEO	KEY LIMIT	
	b PB 0		VIDEO	KEY PVW CTL	
	1			KEY NEXT	
	2		WF	REV	
	3		VIDEO KEY	PST PTN	
	4		WF	EXT/$\overline{\text{INT}}$ (WIPE PATTERN)	
	5		CP	COLOR BARS	
	6		WF	POSITION ON	
	7		VIDEO WF	EFF CUT	
	b PC 0		VIDEO	BKGD	
	1			EFF MATTE	
	2			FTB LIMIT	
	3			SPOT	
	4		VIDEO WF	PGM PVW CTL	
	5		–	UNUSED	
	6		WF	ASPECT ON	
	7		KEY	USK POSI/$\overline{\text{NEGA}}$	

IC	PORT No.	IN/OUT	CONNECTED PCB	SIGNAL NAME	
IC22 (c)	c PA 0	OUT	MT	LDA 0	D/A DATA for 12-bit PARAMETER
	1			LDA 1	
	2			LDA 2	
	3			LDA 3	
	4		–	UNUSED	
	5				
	6				
	7				
	c PB 0		MT	BA 0	D/A DATA for 8-bit PARAMETER
	1			BA 1	
	2			BA 2	
	3			BA 3	
	4			BA 4	
	5			BA 5	
	6			BA 6	
	7			BA 7	
	c PC 0			SELECT D0	PARA-METER SELECT DATA
	1			SELECT D1	
	2			SELECT D2	
	3			SELECT D3	
	4			SELECT D4	
	5		–	UNUSED	
	6				
	7		MT	INHIBIT for IC6, MT PCB	
IC21 (d)	d PA 0	OUT	KEY	KEY MASK ON	
	1		WF	BORDER ON	
	2			MATTE ON	
	3		KEY	DSK KEY IN 0	DSK SOURCE SELECT
	4			DSK KEY IN 1	
	5			DSK POSI/$\overline{\text{NEGA}}$	
	6			DSK MASK ON	
	7			C KEY/$\overline{\text{LUM KEY}}$	
	d PB 0	IN	CPU BOARD S4		DEVICE NO. SET
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	d PC 0		CPU BOARD S3	PARITY $\overline{\text{EVEN}}$	
	1			PARITY $\overline{\text{ENABLE}}$	
	2			STOP BIT	
	3		–	UNUSED	
	4				
	5				
	6				
	7				

Table 2-6

SECTION 2
DISASSEMBLY

2.1 FUSE REPLACEMENT

Before replacing a fuse, the reason why it blew should be invested to prevent trouble from spreading. The malfunction should be repaired before replacing the fuse.

2.1.1 Fuse inside the control unit

1. Set the POWER switch of the control unit to "OFF", and disconnect the power cord from an AC outlet.
2. Open the control panel according to "2.2.3 OPENING THE CONTROL PANEL".
3. There is the fuse on the PS unit on the bottom side.

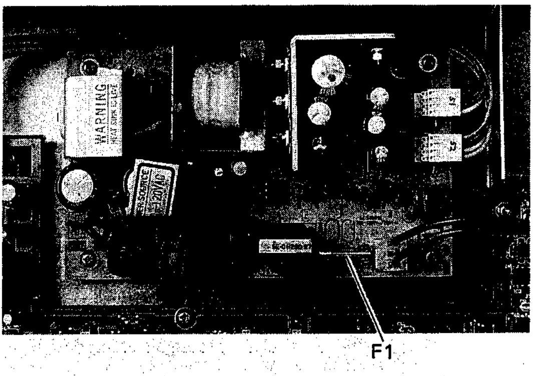


Fig. 2-1

For the safety and protection of the unit, replace only with fuse having specified part numbers.

Symbol No.	Specifications	Part No.
F101 (U ver.)	1.6 A 250 V	QMF51U2-1R6
F101 (E ver.)	T1.6 A 250 V	QMF51A2-1R6

2.1.2 Fuses inside the main unit

1. Set the POWER switch of the main unit to "OFF" and disconnect the power cord from an AC outlet.
2. Remove the top cover following to the section 2.3.2 "REMOVAL OF THE TOP COVER".
3. There are four fuses on the chassis and the PS board.

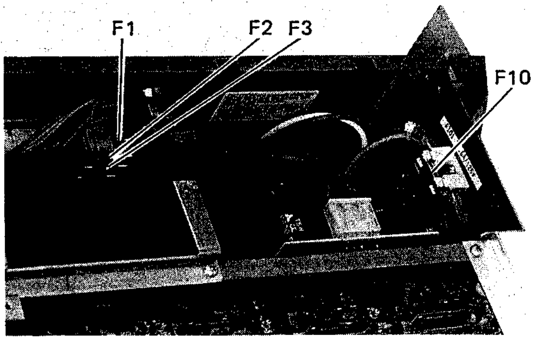


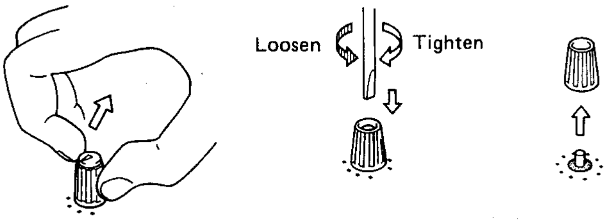
Fig. 2-2

For the safety and protection of the unit, replace only with fuses having specified part numbers.

	Symbol No.	Specifications	Part No.
Primary Fuse	F101 (U ver.)	1.6 A 125 V	QMF51U1-1R6
	F101 (E ver.)	T1A 250 V	QMF51A2-1R0
Secondary Fuses	F1 (U ver.)	4 A 125 V	QMF51U1-4R0
	F2 (U ver.)	3.15 A 125 V	QMF51U1-3R15
	F3 (U ver.)	3.15 A 125 V	QMF51U1-3R15
	F1 (E ver.)	T4 A 250 V	QMF51A2-4R0
	F2 (E ver.)	T3.15 A 250 V	QMF51A2-3R15
	F3 (E ver.)	T3.15 A 250 V	QMF51A2-3R15

2.2 CONTROL UNIT

2.2.1 Removal of knob



Remove the cap.

Loosen the screw turning counterclockwise with a screwdriver.

Remove the knob.

Fig. 2-3

2.2.2 Replacement of assembly lamp

a) Small-sized button

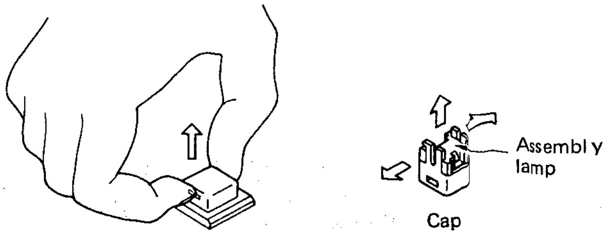


Fig. 2-4

1. Pull off the cap with a finger tip or a screwdriver by inserting its tip into the key slot.
2. Remove the assembly lamp out of the cap, then insert a new lamp as before.

b) Large-sized button

1. Pull up the cover and the cap, then take the lamp out of the cap and insert a new lamp.

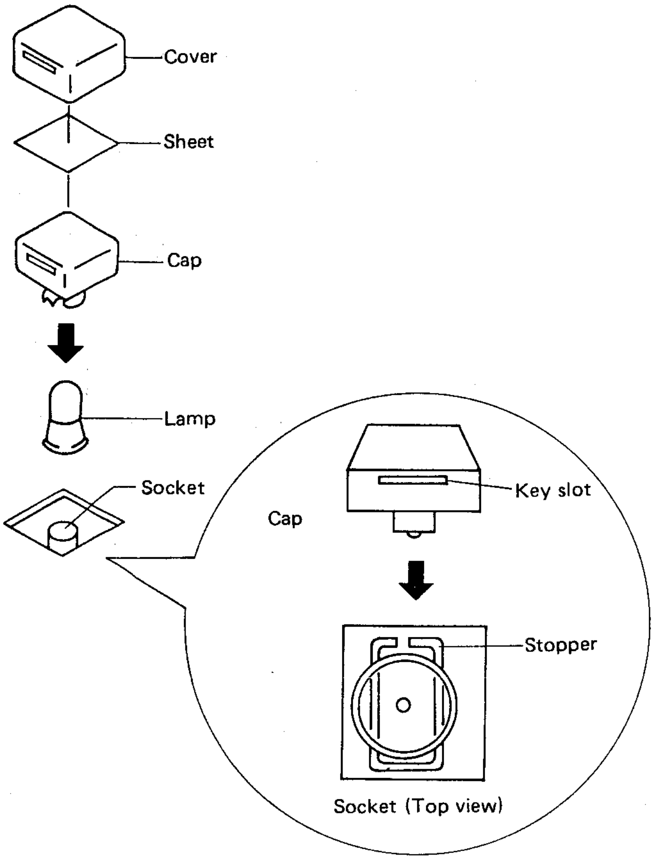

Cover
Sheet
Cap
Lamp
Socket
Cap
Key slot
Stopper
Socket (Top view)

Fig. 2-5

2. After replacing, assemble the button paying attention to the direction of the key slot of the cap and the stopper of the socket.

2.2.3 Opening the control panel

1. Remove seven black screws ①, then open the control panel in the direction of the arrow.

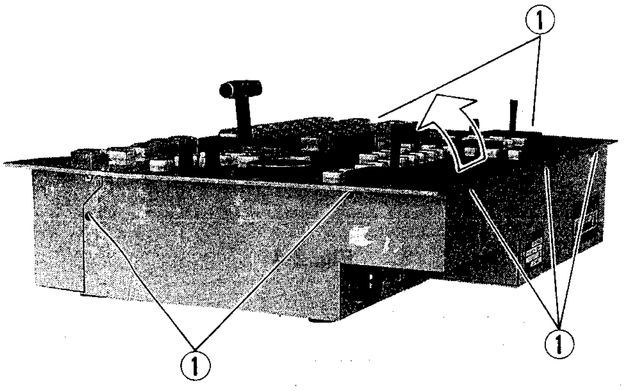


Fig. 2-6

2.2.4 Location of circuit boards

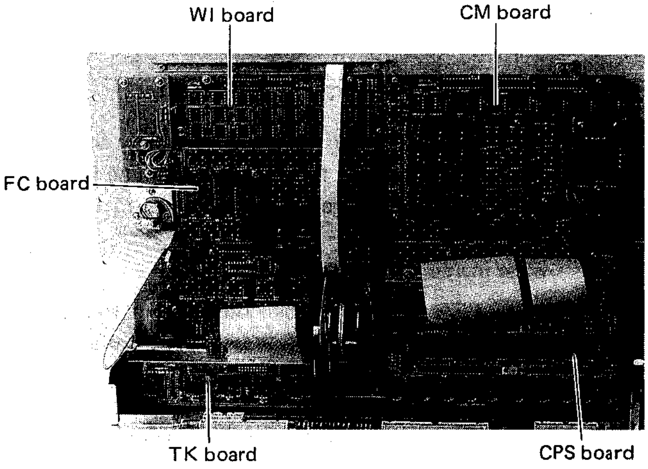

WI board
CM board
FC board
TK board
CPS board

Fig. 2-7 (Panel side)

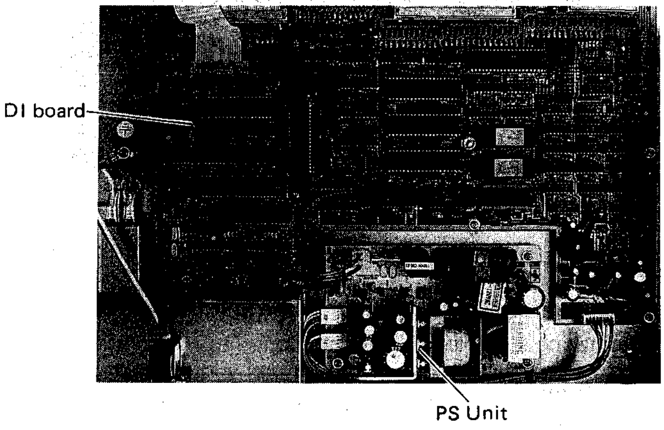

DI board
PS Unit

Fig. 2-8 (Bottom side)

2.2.5 Replacement of large button assemblies

1. There is large buttons at the section Ⓐ (on the CPS board) and the section Ⓑ (on the TK board). Following procedure is described about the buttons of the section Ⓑ as example.

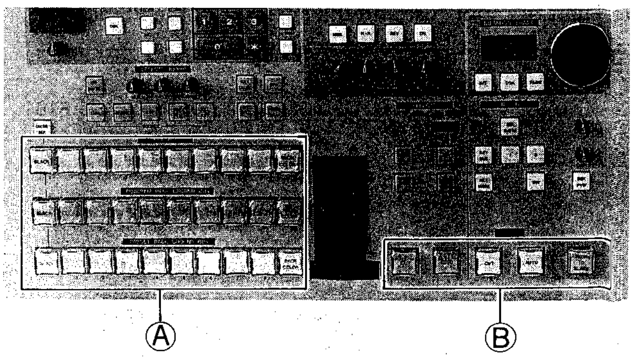


Fig. 2-9

2. Open the control panel following to the section 2.2.3.
3. Remove the connector Ⓒ.
4. Remove three screws ②, then remove the TK board with the bracket.

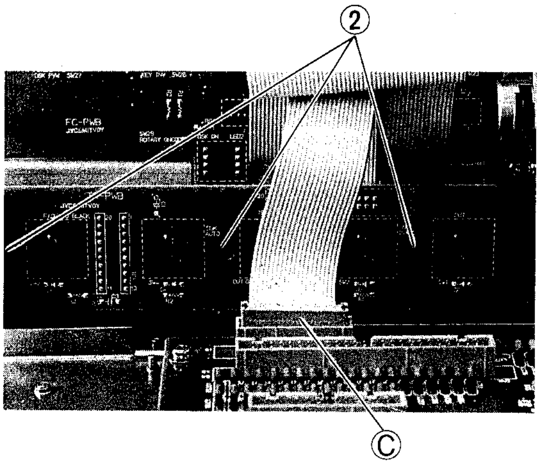


Fig. 2-10

5. Remove all covers, sheets and caps of five buttons Ⓓ.
6. Remove five C-rings Ⓔ.
7. Remove the bracket Ⓕ, then replace the button assembly.

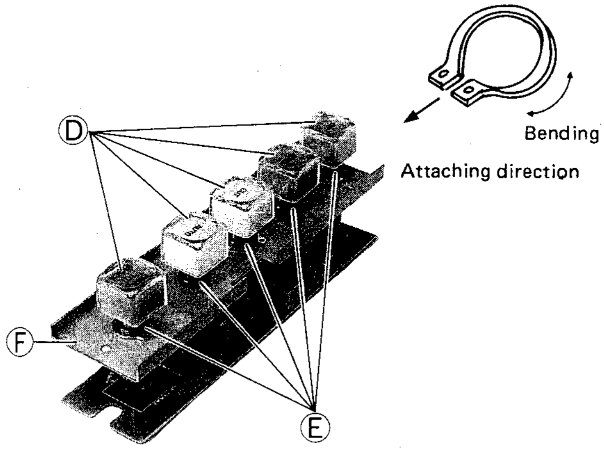


Fig. 2-11

8. C-rings have the direction. Take care to attach them.

2.2.6 Fader laver

a) Removal of the fader lever assembly

1. Remove a screw ③, then remove the knob Ⓖ.

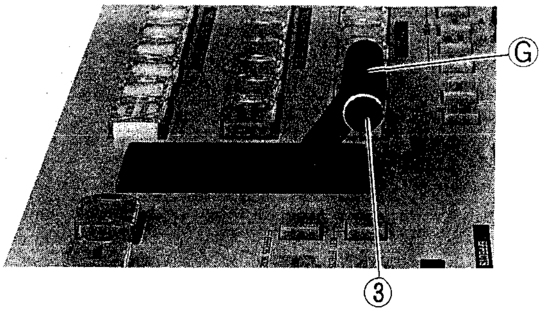


Fig. 2-12

2. Open the control panel following to the section 2.2.3, then remove four screws ④.
3. Remove the fader lever assembly.

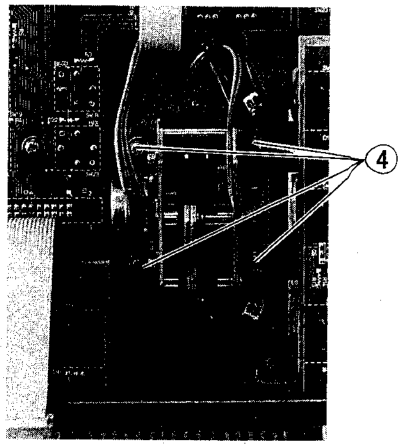


Fig. 2-13

b) Adjusting the torque of the fader lever

1. The torque adjustment of the fader lever can be done by turning a screw ⑤.
   - Turn it clockwise (↻) to increase the torque.
   - Turn it counterclockwise (↺) to decrease the torque.

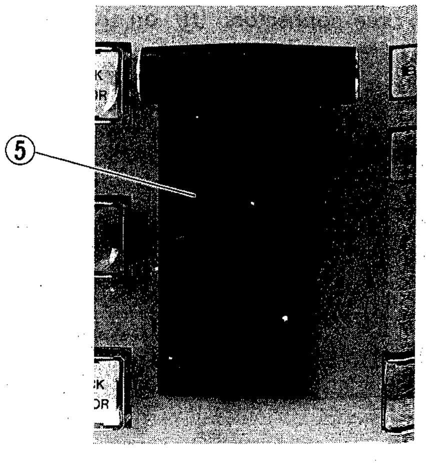


Fig. 2-14

2.3 MAIN UNIT

2.3.1 Removal of the front cover

1. Loosen four screws ⑥ , then remove the front cover.

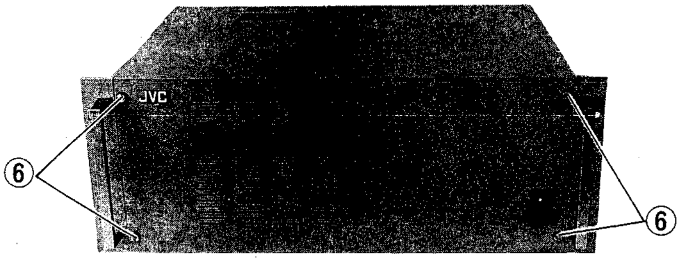


Fig. 2-15

2.3.2 Removal of the top cover

1. Remove eight screws ⑦, then remove the top cover.

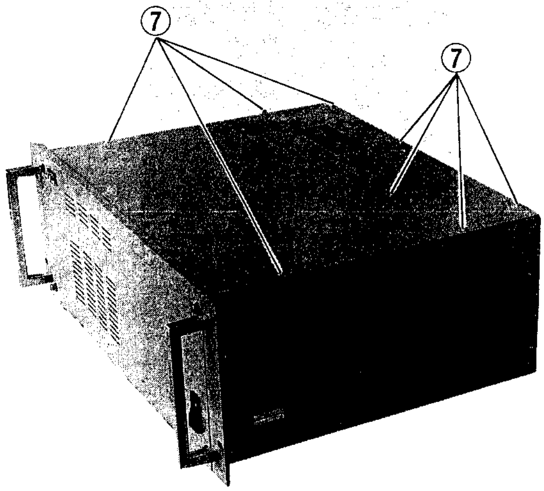


Fig. 2-16

2.3.3 Removal of the rear panel assembly

1. Remove five screws ⑧ on the rear panel and disconnect three connectors Ⓗ on the MT board, then remove the rear panel assembly.

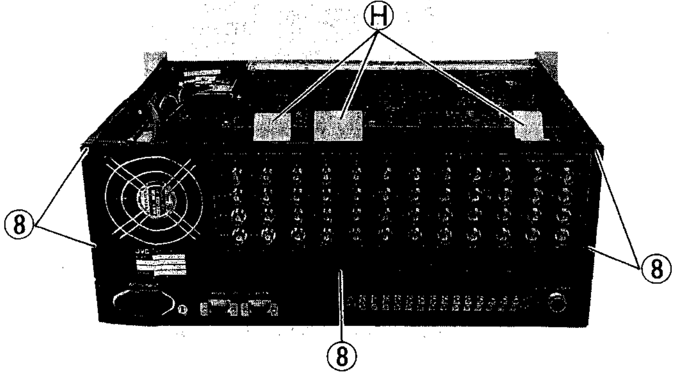


Fig. 2-17

2. By removing the rear panel, the MT board, the RM board and the GPI board can be checked.

2.3.4 Removal of the principal circuit boards

a) Location of the principal circuit boards

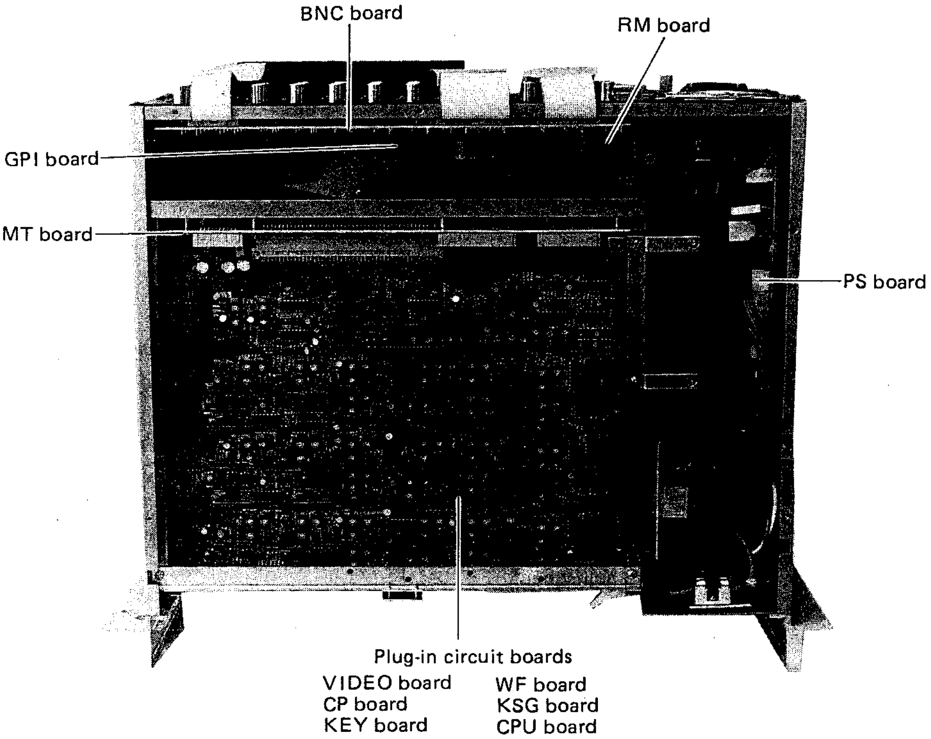

BNC board
RM board
GPI board
MT board
PS board
Plug-in circuit boards
VIDEO board
WF board
CP board
KSG board
KEY board
CPU board

Fig. 2-18

b) Removal of the plug-in circuit boards

1. Remove the front cover following to the section 2.3.1.
2. Loosen two screws ⑨ (cannot be removed), then remove the stopper Ⓘ.
3. Release the hooks Ⓙ (turn to front) on the both sides of the board simultaneously and pull the board out.

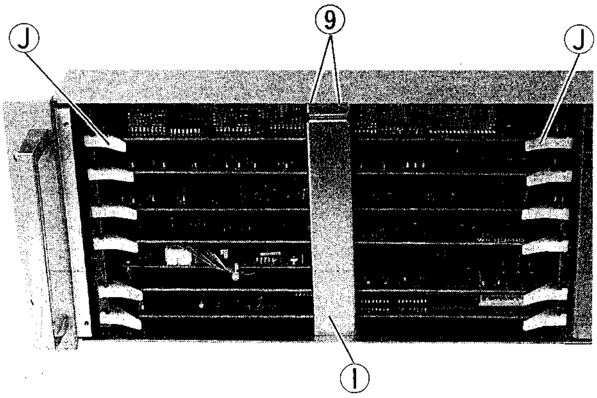


Fig. 2-19

c) Removal of the PS board

1. Remove the top cover following to the section 2.3.2.
2. Remove four screws ⑩, then remove the PS board.

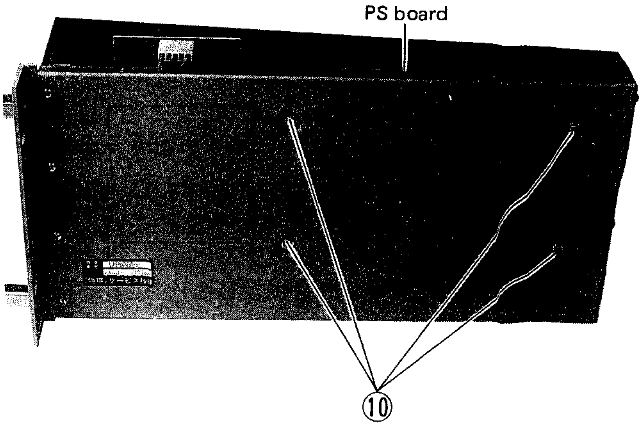
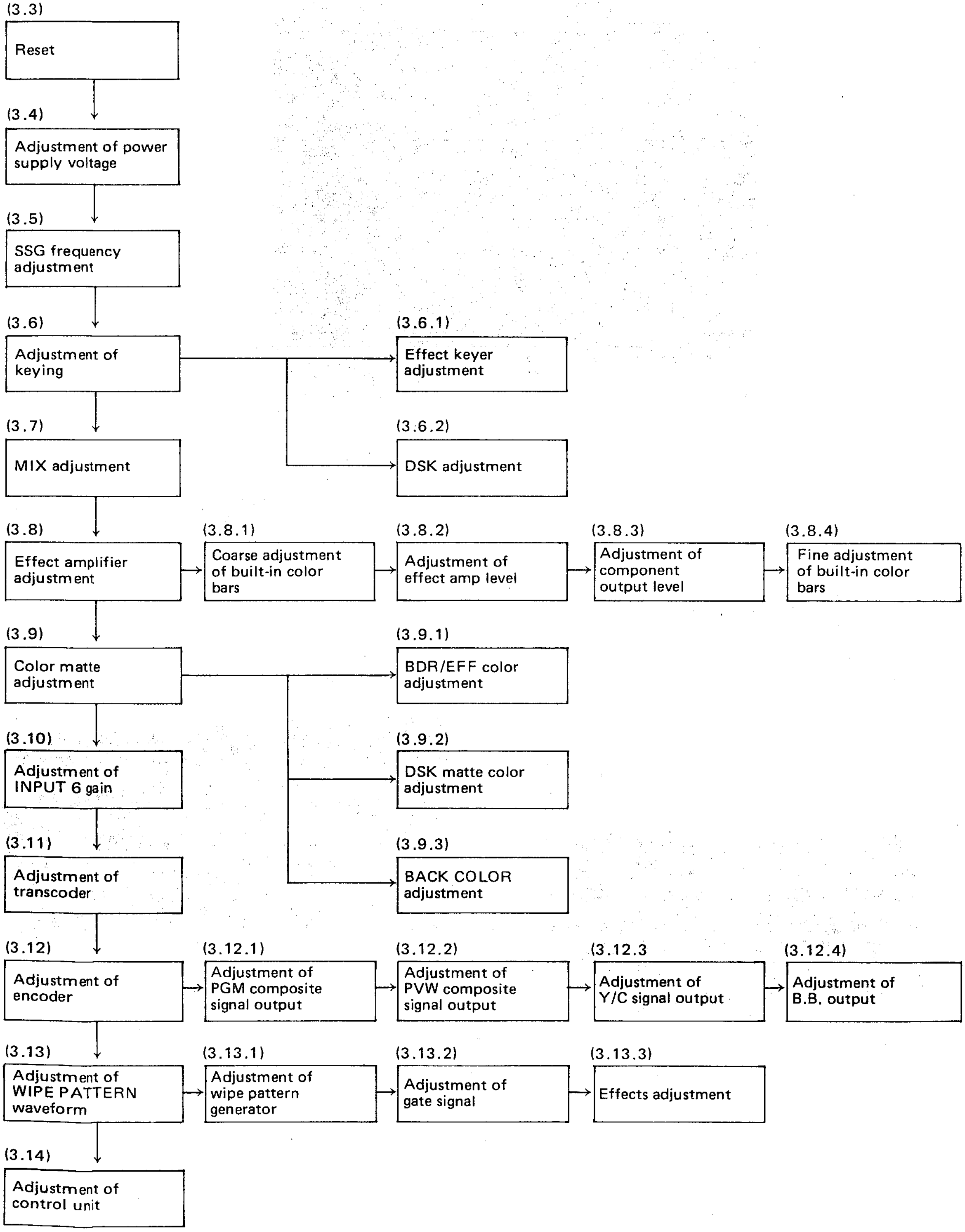


Fig. 2-20

SECTION 3
ADJUSTMENT PROCEDURE

3.1 FLOWCHART OF ELECTRICAL ADJUSTMENT

Note: Figures in parentheses ( ) show article numbers of the items.


(3.3)
Reset
(3.4)
Adjustment of power supply voltage
(3.5)
SSG frequency adjustment
(3.6)
Adjustment of keying
(3.6.1)
Effect keyer adjustment
(3.6.2)
DSK adjustment
(3.7)
MIX adjustment
(3.8)
Effect amplifier adjustment
(3.8.1)
Coarse adjustment of built-in color bars
(3.8.2)
Adjustment of effect amp level
(3.8.3)
Adjustment of component output level
(3.8.4)
Fine adjustment of built-in color bars
(3.9)
Color matte adjustment
(3.9.1)
BDR/EFF color adjustment
(3.9.2)
DSK matte color adjustment
(3.9.3)
BACK COLOR adjustment
(3.10)
Adjustment of INPUT 6 gain
(3.11)
Adjustment of transcoder
(3.12)
Adjustment of encoder
(3.12.1)
Adjustment of PGM composite signal output
(3.12.2)
Adjustment of PVW composite signal output
(3.12.3
Adjustment of Y/C signal output
(3.12.4)
Adjustment of B.B. output
(3.13)
Adjustment of WIPE PATTERN waveform
(3.13.1)
Adjustment of wipe pattern generator
(3.13.2)
Adjustment of gate signal
(3.13.3)
Effects adjustment
(3.14)
Adjustment of control unit

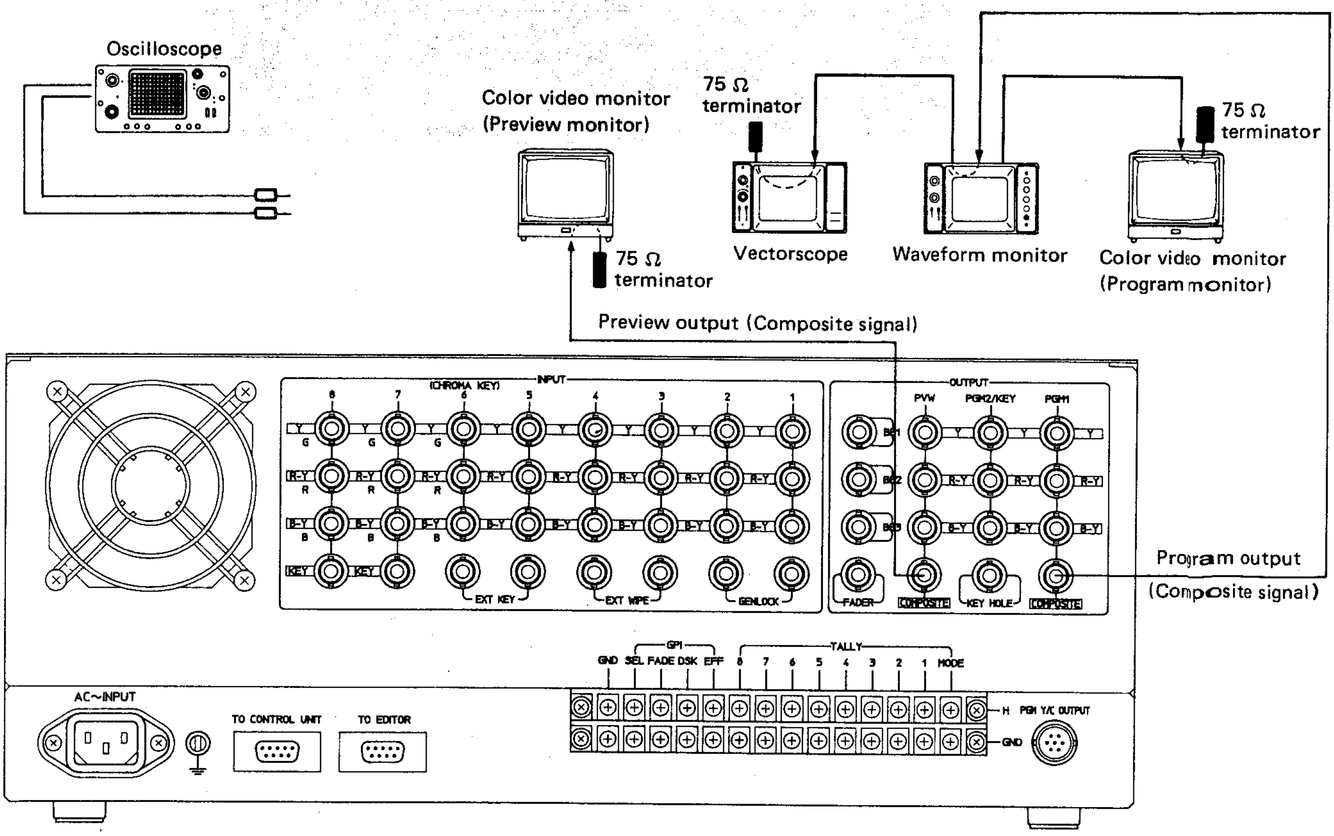
3.2 REQUIRED EQUIPMENT AND STANDARD SETUP FOR ELECTRICAL ADJUSTMENT

3.2.1 Necessary equipment and instruments

1. DC voltmeter (digital voltmeter preferable)
2. Oscilloscope (dual-trace type preferable)
3. Frequency counter
4. Color video monitor (underscan type preferable)
5. Waveform monitor
6. Vectorscope
7. Color video camera and remote control unit (necessary for transcoder adjustment)
   - Combination examples

Color video camera	Remote control unit
KY-15, KY-20	RM-P200

3.2.2 Standard setup and connection


Oscilloscope
Color video monitor
(Preview monitor)
75 Ω
terminator
Vectorscope
Waveform monitor
Color video monitor
(Program monitor)
Preview output (Composite signal)
Program output
(Composite signal)
INPUT
(CHROMA KEY)
8
7
6
5
4
3
2
1
Y
G
R-Y
R
B-Y
B
KEY
EXT KEY
EXT WIPE
GENLOCK
OUTPUT
PVW
PGM2/KEY
PGM1
BG1
BG2
BG3
FADER
COMPOSITE
KEY HOLE
GPI
TALLY
GND
SEL
FADE
DSK
EFF
MODE
H
PGM Y/C OUTPUT
AC~INPUT
TO CONTROL UNIT
TO EDITOR

3.3 BEFORE ADJUSTMENT

For correct adjustment, it is necessary to reset the KM-3000 before proceeding to do it.

There are two ways to reset the KM-3000 as follows:

- After all controls are set to the fully counterclockwise position respectively,

1. Turn off the POWER switch of the main unit once, and then turn it on again.
2. Press S1 (HARD RESET switch) on the CPU board of the main unit.

If KM-3000 is reset with controls set halfway, inside CPU processes data about controls as if all controls were set to the fully counterclockwise positions.
In this case, data about controls are newly processed for information when set position of control(s) are changed.

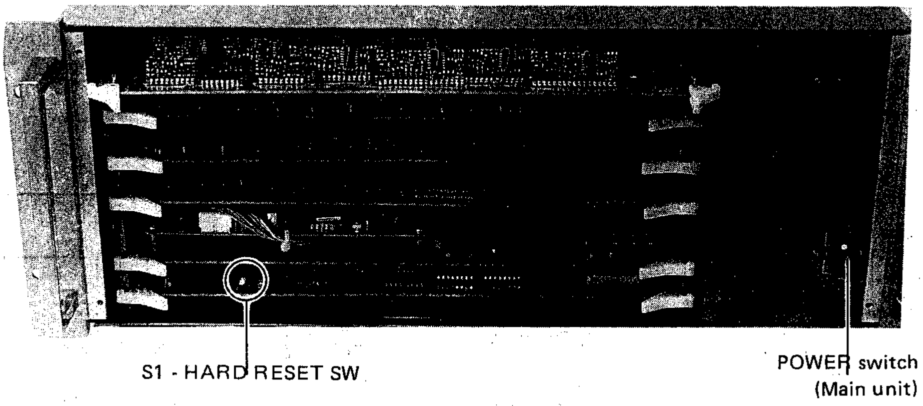
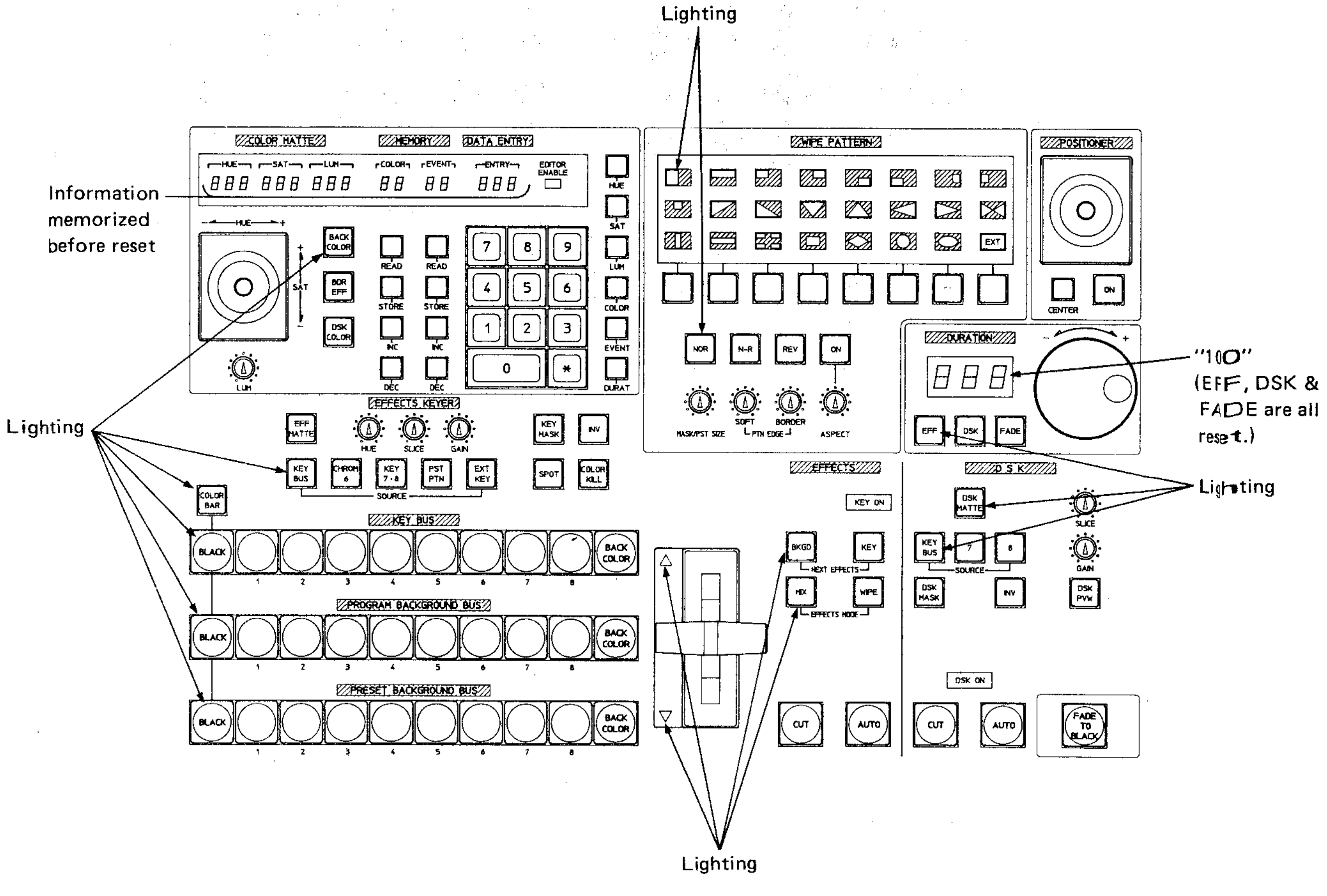

S1 - HARD RESET SW
POWER switch
(Main unit)

Fig. 3-1

Confirm that indicators are in the condition shown below as the KM-3000 has been reset.


Lighting
Information memorized before reset
Lighting
"10"
(EFF, DSK & FADE are all reset.)
Lighting
Lighting
COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
DURAT
WIPE PATTERN
EXT
POSITIONER
CENTER
ON
NOR
N-R
REV
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
DURATION
EFF
DSK
FADE
EFFECTS KEYER
EFF MATTE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SPOT
COLOR KILL
SOURCE
COLOR BAR
KEY BUS
BLACK
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
CUT
AUTO
D S K
DSK MATTE
DSK MASK
DSK PVW
DSK ON
FADE TO BLACK

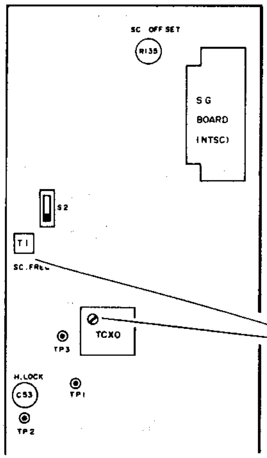
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure

3.4 ADJUSTMENT OF POWER SUPPLY VOLTAGE

1	–9 V DC power supply	Digital voltmeter	◎ TP32 [KSG board] ⌽ –0 V ADJ (R12) [PS board]	1) Connect the extension board to KSG board. 2) Adjust R12 to obtain –9 V DC correctly. It is necessary to remove the PS board for this adjustment. Perform the checking only in ordinary servicing.
2	+9 V DC power supply		◎ TP30 [KSG board]	3) Confirm +9 V DC output at TP30.

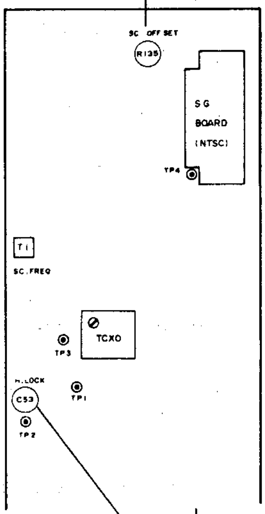
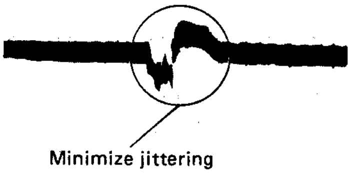
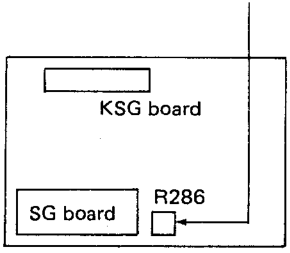
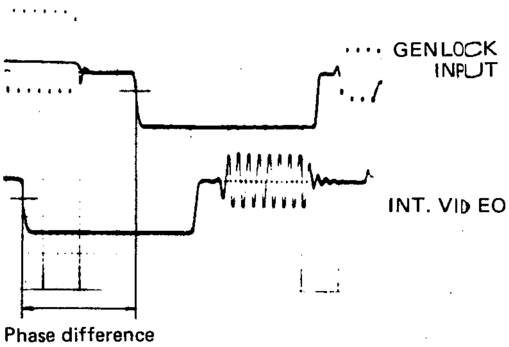
3.5-N SSG FREQUENCY ADJUSTMENT (NTSC version)

1	SC frequency	Frequency counter Oscilloscope		• Warm up the set more than 15 minutes after power is turned on. • Specifications of a frequency counter to be used: (1) Indication of 8 figures or more. (2) Stability of more than 0.1 ppm or 1 x 10^{-7} at 0°C to 40°C. 1) Adjust the following test points so as to obtain the values specified in the table below.



	Test points	Adjustment parts	Adjustment level
SC frequency	TP3 [SG board]	TXCO [SG board]	3.579545 MHz ± 5 Hz
SC output waveform	TP4 [SG board]	SC FREQ. (T1) [SG board]	Maximum output amplitude

Note: Since adjustment of SC FREQ. (T1) results in H. PHASE alteration, make sure to perform the H. PHASE adjustment described in the following step No. 4 after this adjustment.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
2	Offset	Oscilloscope (V-rate)	◎ TP1 [SG board] ⦶ OFFSET (R135) [SG board]  SC OFF SET R135 SG BOARD (NTSC) TP4 T1 SC.FREQ TCXO TP3 H.LOCK C53 TP1 TP2	• Connect a TV test signal generator to a GENLOCK INPUT terminal on the rear panel and supply VBS or BB (black burst) signal, while the other is terminated with a 75-ohm resistance. 1) Connect an oscilloscope to TP1 of the SG board. 2) Adjust R135 (OFFSET) to minimize jittering of the waveform as shown in the figure.  Minimize jittering
3	H. lock	Digital voltmeter	◎ TP2 [SG board] ⦶ H. LOCK (C53) [SG board]	3) Adjust C53 to obtain 4.5 ± 0.2 V at TP2.
4	H. phase	Oscilloscope (H-rate)	⦶ H. PHASE (R286) [KSG board]  KSG board SG board R286	4) Remove the 75-ohm terminator from the GENLOCK INPUT terminal, and connect a probe (CH-1) of a dual-trace oscilloscope to the terminal. 5) Connect the other probe (CH-2) of the oscilloscope to the COMP VIDEO OUTPUT terminal. 6) Observing the two inputs on the oscilloscope at the same time, compare their phases (in H. SYNC portion). 7) Adjust R92 (H. PHASE) so that sync. signals of VIDEO input and GENLOCK input coincide with each other (see the figure below).  GENLOCK INPUT INT. VIDEO Phase difference

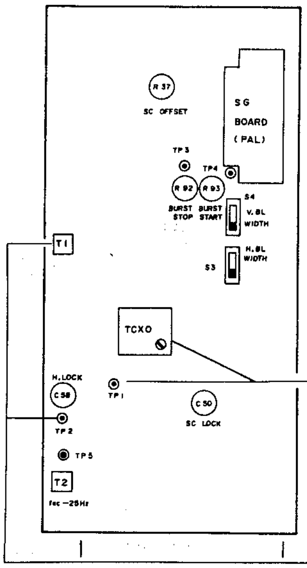
No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures

3.5-P SSG ADJUSTMENT (PAL version)

No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points
1	SC frequency adjustment	Frequency counter Oscilloscope	

- Warm up the camera for more than 15 minutes, with the lens iris closed.
- The frequency counter is:
  1) The 8 digits or more display is preferable.
  2) Required of an accuracy of more than 0.1 ppm, or 1 x 10^{-7}, at 0°C to 40°C.
- Take out SG board 9 , attach an extension board and reset.

(1) Adjust as shown in the tabel below.


R 37
SC OFFSET
SG BOARD (PAL)
TP3
TP4
R 92
R 93
BURST STOP
BURST START
S4
V.BL WIDTH
H.BL WIDTH
S3
T1
TCXO
H.LOCK
C58
TP1
TP2
TP5
T2
fsc−25Hz
C50
SC LOCK

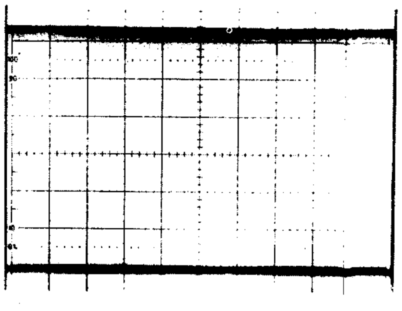
	Signal	Test Point	SG board
SC Frequency	4.433619 MHz ± 10 Hz	SG board TP1	TCXO
SC Output	Maximum Amplitude	SG board TP2	SC FREQ

No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points
2	Internal fsc-25Hz lock adjustment	Oscilloscope	fsc-25 Hz (T2) 282 fh LOCK (C58)

(1) Connect an oscilloscope to TP5 with H-rate time division.

(2) Adjust core of transformer (T2) so that maximum output amplitude.

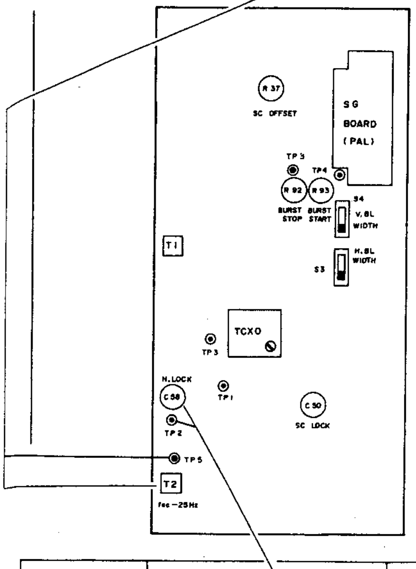
Test Point	Adjustment	
TP5	fsc-25 Hz (T2) Transformer	Maximum Output (3 Vp-p or more)

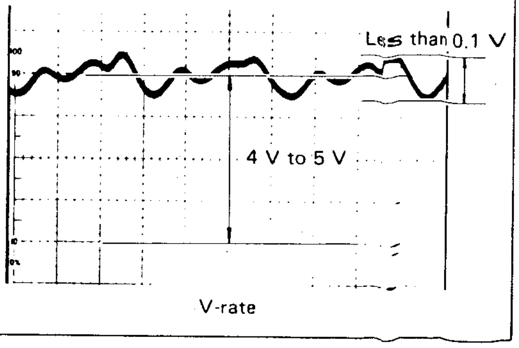


H-rate

(3) Connect an oscilloscope to TP2 with V-rate time division.

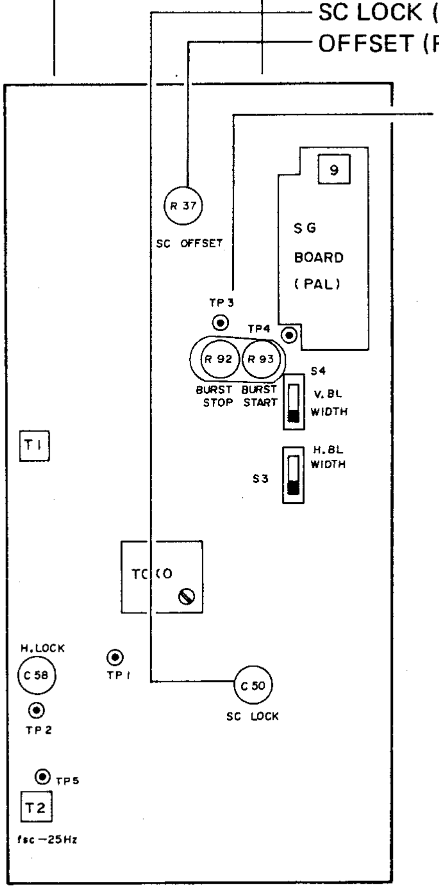
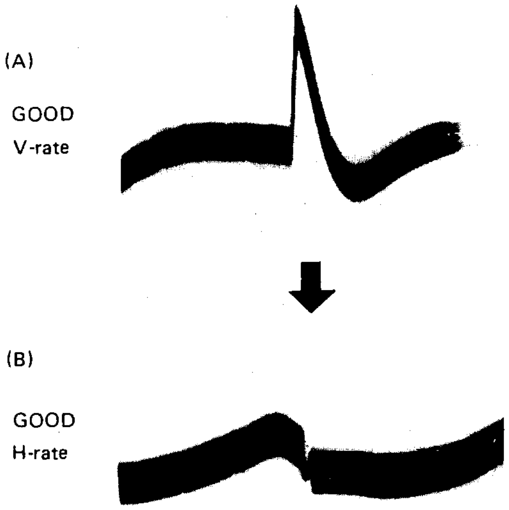
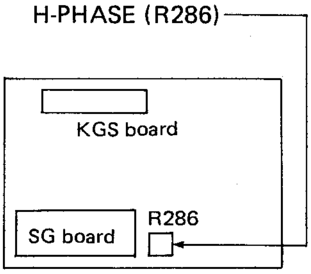
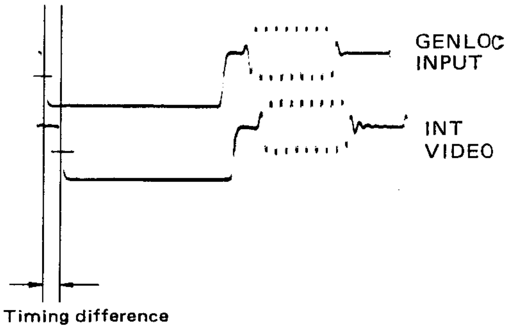
(4) Adjust trimmer capacitor (C58) so that averaged DC level of waveform is 4 V to 5 V and minimum ripple are observed.


R 37
SC OFFSET
SG BOARD (PAL)
TP3
TP4
R 92
R 93
BURST STOP
BURST START
S4
V.BL WIDTH
H.BL WIDTH
S3
T1
TCXO
TP3
H.LOCK
C58
TP1
TP2
TP5
T2
fsc−25Hz
C50
SC LOCK

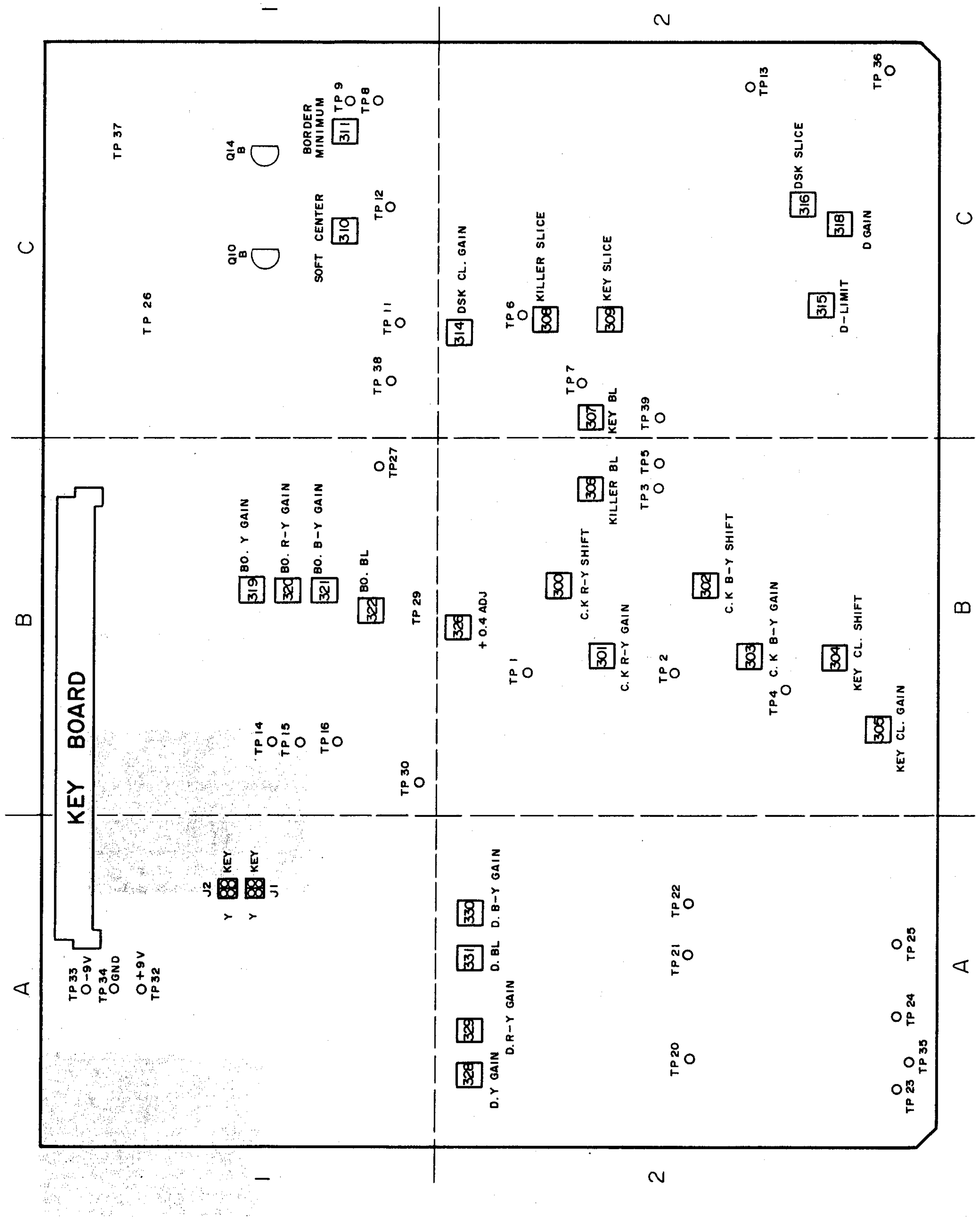


V-rate

TP2	282 fh LOCK (C58) Trimmer capacitor	Ripple : Less than 0.1 V Average DC : 4 to 5 V

No.	Items	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures
3	SC LOCK adjustment	Digital voltmeter Oscilloscope (V-rate: 10 : 1)	TP3 SC LOCK (C50) OFFSET (R37)  R 37 SC OFFSET 9 SG BOARD (PAL) TP3 TP4 R 92 R 93 BURST STOP BURST START S4 V.BL WIDTH H.BL WIDTH S3 T1 TCXO H.LOCK C 58 TP1 C 50 SC LOCK TP2 TP5 T2 fsc −25Hz	(1) Apply composite video or black burst signal from a sync pulse generator to the GENLOCK INPUT terminal of the camera. (2) Adjust SC LOCK (C50) so that the SG board TP3 DC level is 4.5 V ± 0.3 V. (3) Adjust OFFSET (R37) to minimize the waveform as shown below (jittering).  (4) Set the vectorscope, if used, to EXT LOCK, and adjust SC LOCK (C50) so that the jitter is minimized.
4	H-PHASE adjustment	Oscilloscope (H-rate: 10 : 1)	KSG board H-PHASE (R286)  KGS board SG board R286	(1) Remove the 75 Ω termination plug on the GENLOCK INPUT, then connect A channel of a dual-trace oscilloscope to GENLOCK INPUT. (2) Connect the B CH oscilloscope input to the COMP VIDEO OUTPUT connector. (3) Observe the two inputs simultaneously on the oscilloscope and compare their phases. (4) Adjust the KSG board H-PHASE (R286) so that the internal video (camera output) H-sync is coincide with GENLOCK INPUT (external reference signal).  GENLOCK INPUT INT VIDEO Timing difference

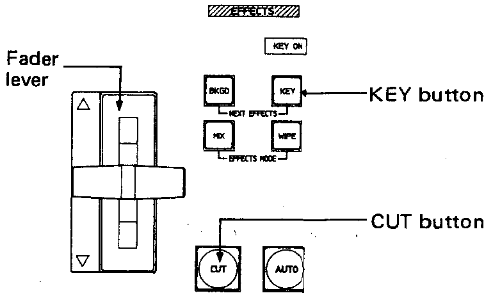
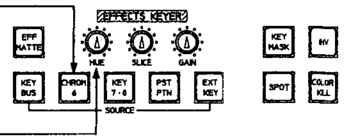
■ **Adjustment parts location of KEY board**

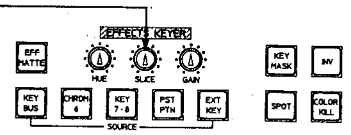
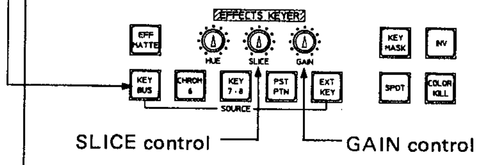
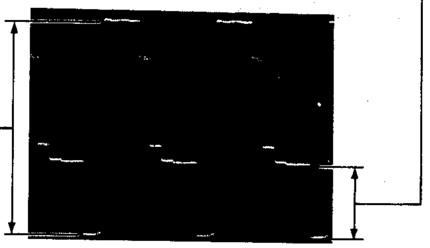

KEY BOARD
1
2
A
B
C
TP 37
TP 26
Q14 B
Q10 B
BORDER MINIMUM
311
TP 9
TP 8
SOFT CENTER
310
TP 12
TP 11
TP 38
DSK CL. GAIN
314
TP 6
KILLER SLICE
308
KEY SLICE
309
TP 7
307
KEY BL
TP 39
TP13
DSK SLICE
316
318
D GAIN
315
D-LIMIT
TP 36
TP27
BO. Y GAIN
319
BO. R-Y GAIN
320
BO. B-Y GAIN
321
BO. BL
322
TP 29
326
+ 0.4 ADJ
300
C.K R-Y SHIFT
306
KILLER BL
TP3
TP5
302
C.K B-Y SHIFT
301
C.K R-Y GAIN
TP 1
TP 2
303
C.K B-Y GAIN
TP4
304
KEY CL. SHIFT
305
KEY CL. GAIN
TP 14
TP 15
TP 16
TP 30
J2 KEY Y
J1 KEY Y
330
D. B-Y GAIN
331
D. BL
329
D.R-Y GAIN
328
D.Y GAIN
TP 22
TP 21
TP 20
TP 25
TP 24
TP 35
TP 23
TP33 -9V
TP34 GND
+9V TP32

3.6 ADJUSTMENT OF KEYING

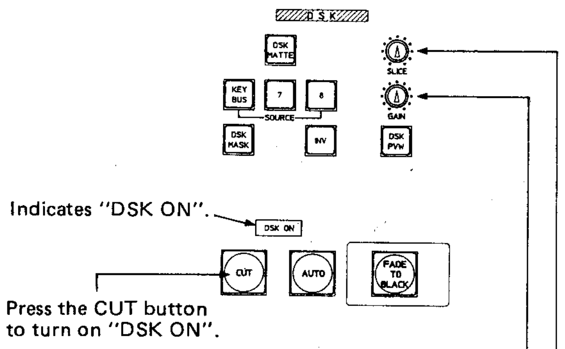
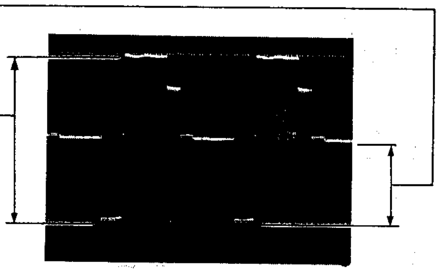
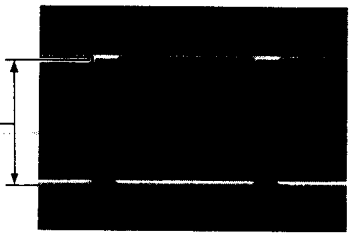
Note: For the following procedure, refer to "Adjustment parts location of KEY board" on page 3-6.
Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

3.6.1 Effect keyer adjustment

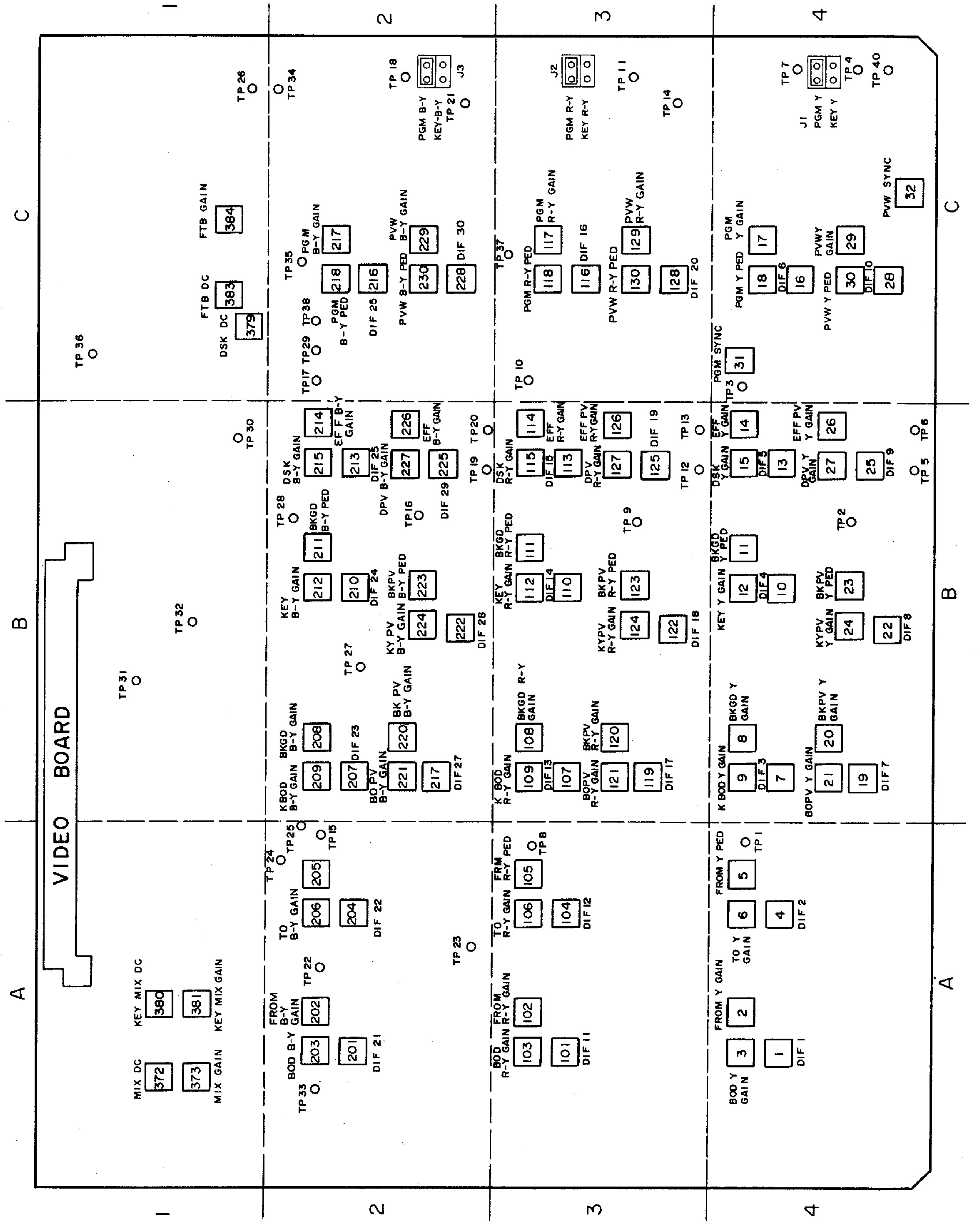
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
1	Basic setup	**Precaution:** All the adjustments of this section should be proceeded in the following condition. Up to completion of all the procedure, do not turn or touch all controls and buttons except those specified.		1) Connect an extension board to the KEY board. 2) Set the Fader lever to the lowest position and reset the whole unit referring to description of Section 3.3. After this, make sure to confirm that the set is completely reset. (In the reset mode, color bars signal is output.) 3) Press the KEY button. 4) Press the CUT button, and the "KEY ON" indicator comes on by this operation.  EFFECTS KEY ON Fader lever KEY button CUT button CUT AUTO
2	HUE control	Oscilloscope (H-rate, 10 : 1 DC input)		1) Press "CHROM 6" button.  EFFECTS KEYER HUE SLICE GAIN SOURCE
			◎ TP1 [KEY - 2B] ⦶ HUE control ☆ Minimize the DC level	2) Set the HUE control so that the DC level of TP1 becomes minimum.
			◎ TP1 [KEY - 2B] ⦶ C. KEY B-Y SHIFT (R300) [KEY - 2B] ☆ −150 mV DC	3) Adjust the DC level. 4) Turn the HUE control fully counterclockwise.
			◎ TP1 [KEY - 2B] ⦶ C. KEY R-Y GAIN (R301) [KEY - 2B] ☆ 0 V DC	5) Adjust the DC level. 6) Set the HUE control so that the DC level of TP2 becomes minimum.
			◎ TP2 [KEY - 2B] ⦶ C. KEY R-Y SHIFT (R302) [KEY - 2B] ☆ −150 mV DC	7) Adjust the DC level. 8) Turn the HUE control fully counterclockwise.
			◎ TP2 [KEY - 2B] ⦶ C. KEY B-Y GAIN (R303) [KEY - 2B] ☆ 150 mV DC	9) Adjust the DC level.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
3	SLICE control	Oscilloscope (H-rate, 10 : 1, DC input)	◎ TP4 [KEY - 2B] ⦶ KEY CL GAIN (R305) [KEY - 2B] ☆ Level difference: 1.5 V	1) Adjust R305 so that level difference between the two conditions that the SLICE control is turned fully counterclockwise and turned fully clockwise becomes 1 V.  EFFECTS KEYER EFF MATTE HUE SLICE GAIN KEY MASK INV KEY BUS CHROM 6 KEY 7-8 PST PTN EXT KEY SOURCE SPOT COLOR KILL
			◎ TP4 [KEY - 2B] ⦶ KEY CL SHIFT (R304) [KEY - 2B] ☆ −300 mV to 1.2 V by turning SLICE control	2) Adjust R304 so that DC level alters from −300 mV to 1.2 V as the SLICE control is turned from the fully counterclockwise position to the fully clockwise position.
4	Key hall level	Oscilloscope (H-rate: 10 : 1, AC input)	◎ TP6 [KEY - 2C] ⦶ KILLER BL (R306) [KEY -2B] ☆ 0.4 V	1) Press the KEY BUS button.  EFFECTS KEYER EFF MATTE HUE SLICE GAIN KEY MASK INV KEY BUS CHROM 6 KEY 7-8 PST PTN EXT KEY SOURCE SPOT COLOR KILLSLICE control GAIN control 2) Turn the SLICE control to its mechanical center. Turn the GAIN control fully clockwise. 3) Adjust pedestal level to meet the specified value (0.4 V).
			◎ TP7 [KEY - 2C] ⦶ KEY BL (R307) [KEY - 2C] ☆ 0.4 V	
			◎ TP6 [KEY - 2C] ⦶ KILLER SLICE (R308) [KEY - 2C] ☆ 1.2 Vp-p	4) Adjust pedestal level to meet the specified value (1.2 Vp-p).
			◎ TP7 [KEY - 2C] ⦶ KEY SLICE (R309) [KEY - 2C] ☆ 1.2 Vp-p	

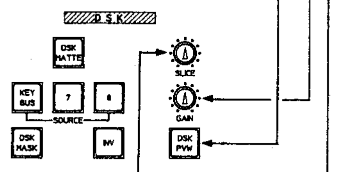
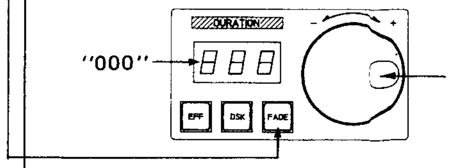
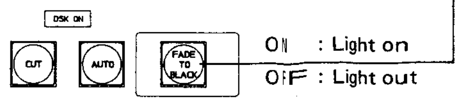
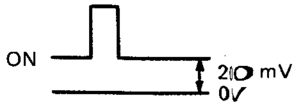
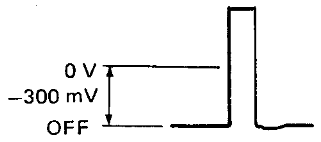
3.6.2 DSK adjustment

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
1	Basic setup		 DSK DSK MATTE KEY BUS 7 8 SOURCE DSK MASK INV SLICE GAIN DSK PVW DSK ON CUT AUTO FADE TO BLACKIndicates "DSK ON". Press the CUT button to turn on "DSK ON".	1) Connect an extension board to the KEY board. 2) Set the Fader lever to the lowest position and reset the whole unit referring to the procedure described in Section 3.3. After this step, confirm that the set is completely reset. 3) Set the following buttons as shown in the figure below.
2	SLICE control	Oscilloscope (H-rate, 10 : 1, DC input)	◎ TP11 [KEY - 1C] ⦶ DSK CL GAIN (R314) [KEY - 2C] ☆ 800 mV DC	1) Turn the SLICE control fylly counterclockwise. 2) Adjust DC level to meet the specified value.
3	Key hall	Oscilloscope (H-rate, 10 : 1)	◎ TP13 [KEY - 2C] ⦶ +0.4 V ADJ (R326) [KEY - 2B] ☆ Pedestal level : 0.4 V.	1) Turn the SLICE control to its mechanical center. Turn the GAIN control fully clockwise. 2) Adjust R326 and R316 for pedestal level and peak level as specified.
			⦶ DSK CLIP (R316) [KEY - 2C] ☆ Peak level : 0.4 V.	
			⦶ DSK GAIN (R318) [KEY - 2C] ☆ 0.5 Vp-p	3) Press the CUT button so as to turn on "DSK ON". 4) Adjust peak level to meet the specified value (0.5 Vp-p). 

■ **Adjustment parts location of VIDEO board**



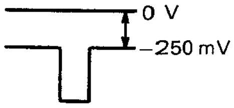
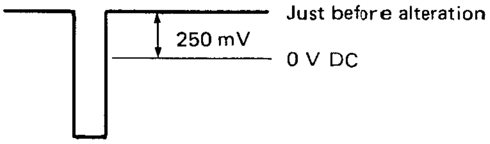
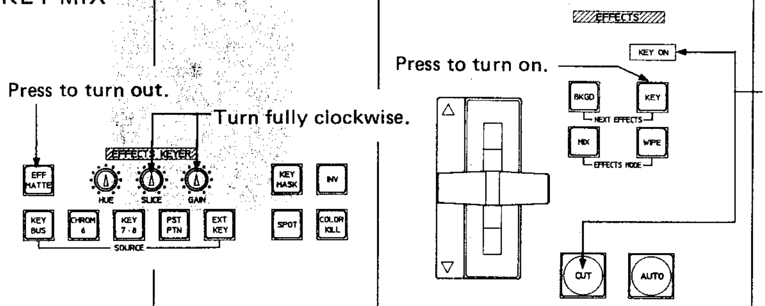
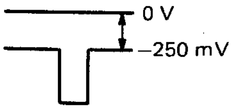
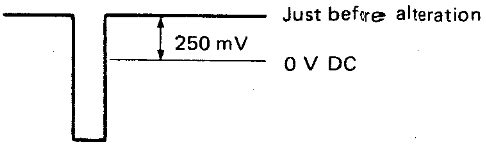
VIDEO BOARD
1
2
3
4
A
B
C
FTB GAIN
384
FTB DC
383
DSK DC
379
TP 36
TP 26
TP 34
TP 18
J3
PGM B-Y
KEY-B-Y
TP 21
J2
PGM R-Y
KEY R-Y
TP 11
TP 14
TP 7
J1
PGM Y
KEY Y
TP 4
TP 40
PVW SYNC
32
PGM B-Y GAIN
217
PVW B-Y GAIN
229
DIF 30
TP35
PGM B-Y PED
218
216
230
228
DIF 25
PVW B-Y PED
TP 38
TP29
TP17
TP37
PGM R-Y GAIN
117
PVW R-Y GAIN
129
DIF 16
PGM R-Y PED
118
116
130
128
PVW R-Y PED
DIF 20
TP 10
PGM Y GAIN
17
PVWY GAIN
29
PGM Y PED
18
16
DIF 6
30
28
DIF 10
PVW Y PED
PGM SYNC
31
TP3
TP 30
214
215
213
DSK B-Y GAIN
EFF B-Y GAIN
226
227
225
EFF B-Y GAIN
DPV B-Y GAIN
DIF 29
TP20
TP19
TP 28
TP16
114
115
113
EFF R-Y GAIN
EFF PV R-Y GAIN
DIF 15
DSK R-Y GAIN
126
127
125
DPV R-Y GAIN
DIF 19
TP 13
TP 12
14
15
13
EFF Y GAIN
DSK Y GAIN
DIF 5
26
27
25
EFF PV Y GAIN
DPV Y GAIN
DIF 9
TP6
TP5
BKGD B-Y PED
211
KEY B-Y GAIN
212
210
DIF 24
BKPV B-Y PED
223
KY PV B-Y GAIN
224
222
DIF 28
TP 27
TP 32
TP 9
BKGD R-Y PED
111
KEY R-Y GAIN
112
110
DIF 14
BKPV R-Y PED
123
KYPV R-Y GAIN
124
122
DIF 18
BKGD Y PED
11
KEY Y GAIN
12
10
DIF4
TP2
BKPV Y PED
23
KYPV Y GAIN
24
22
DIF 8
TP 31
BKGD B-Y GAIN
208
BK PV B-Y GAIN
220
KBOD B-Y GAIN
209
207
DIF 23
BOPV B-Y GAIN
221
217
DIF 27
BKGD R-Y GAIN
108
BKPV R-Y GAIN
120
K BOD R-Y GAIN
109
107
DIF 13
BOPV R-Y GAIN
121
119
DIF 17
BKGD Y GAIN
8
BKPV Y GAIN
20
K BOD Y GAIN
9
7
DIF 3
BOPV Y GAIN
21
19
DIF 7
TP24
TP25
TP15
205
TO B-Y GAIN
206
204
DIF 22
TP 23
FRM R-Y PED
105
TP8
TO R-Y GAIN
106
104
DIF 12
FROM Y PED
5
TP 1
TO Y GAIN
6
4
DIF 2
KEY MIX DC
380
381
KEY MIX GAIN
MIX DC
372
373
MIX GAIN
FROM B-Y GAIN
202
TP 22
BOD B-Y GAIN
203
201
DIF 21
TP 33
FROM R-Y GAIN
102
BOD R-Y GAIN
103
101
DIF 11
FROM Y GAIN
2
BOD Y GAIN
3
1
DIF 1

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (①) Adjustment level (☆)	Adjustment procedure
4	Slice level of preview output	Color video monitors (2 sets)	◎ PGM 1 OUTPUT → Program monitor (component or composite signal) ◎ PVW OUTPUT → Preview monitor (component or composite signal)  DSK DSK MATTE KEY BUS SOURCE DSK MASK INV DSK PVW SLICE GAIN ① DSK DC (R379) [VIDEO - 1C] ☆ Even effect of SLICE control	1) Connect an extension board to the VIDEO board or take off the top cover to be able to see the VIDEO board. 2) Observing the monitors (one for PROGRAM and the other for PREVIEW) at the same time, proceed to adjust slice level. 3) Set the buttons according to the basic setup procedure (Item 1-2) & 3)). 4) Press the DSK PVW button to turn it on. 5) Set the GAIN control to its mechanical center. 6) Adjust the SLICE control so that the PROGRAM BACKGROUND picture and DSK MATTE COLOR are mixed with each other. 7) Adjust R379 so that the SLICE control effectuate the both monitors.
5	Fade to Black	Oscilloscope (H-rate, 10 : 1, DC input)	◎ TP38 [VIDEO - 2C] ① FTB GAIN (R384) [VIDEO - 1C] ☆ −300 mV DC ① FTB DC (R383) [VIDEO - 1C] ☆ 200 mV DC	1) Press the FADE button and set the indicator to "000" by turning the dial.  DURATION "000" Dial EFF DSK FADE 2) With the FADE button set to "ON", adjust DC level to meet the specified value.  DSK ON CUT AUTO FADE TO BLACK ON : Light on OFF : Light out  3) By turning off the FADE TO BLACK button, adjust DC level to meet the specified value.  0 V −300 mV OFF

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

3.7 MIX ADJUSTMENT

Note: For the following procedure, refer to "Adjustment parts location of VIDEO board" on page 3-8.
Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

1	Initial setup			1) Connect an extension board to the VIDEO board or take off the top cover to be able to see the VIDEO board. 2) Set the Fader lever to the lowest position and reset the whole unit according to the procedure described in the section 3.3. After this, confirm that the set is completely reset.
2	BKGD MIX	Oscilloscope (H-rate, 10 : 1, DC input)	◎ TP23 [VIDEO - 2A] ⏀ MIX DC (R372) [VIDEO - 1A] ☆ −250 mV DC ⏀ MIX GAIN (R373) [VIDEO - 1A] ☆ 250 mV DC	1) By moving the Fader lever gradually upward, confirm that waveform alters at a moment when the lever is set to the topmost position. By a reverse operation from the top to the bottom, also confirm that the waveform momentarily alters as the lever reaches the endmost position. 2) Adjust DC level of waveform just after alteration so as to be of the specified value (−250 mV DC).  3) Adjust DC level (just before alteration) to meet the specified value (250mV).  Just before alteration 250 mV 0 V DC
3	KEY MIX		 Press to turn out. Turn fully clockwise. EFFECTS KEYER EFF MATTE HUE SLICE GAIN KEY MASK INV KEY BUS CHROM 6 KEY 7・8 PST PTN EXT KEY SOURCE SPOT COLOR KILL Press to turn on. EFFECTS KEY ON BKGD KEY NEXT EFFECTS MIX WIPE EFFECTS MODE CUT AUTO ◎ TP29 [VIDEO - 2C] ⏀ KEY MIX DC (R380) [VIDEO - 1A] ☆ −250 mV DC ⏀ KEY MIX GAIN (R381) [VIDEO - 1A] ☆ 250 mV DC	1) Set buttons and controls as shown in the figure. 2) Confirm that "KEY ON" is turned on and off alternately by pressing the CUT button. 3) Adjust DC level of waveform at "KEY ON" turned out to meet the specified value.  4) Adjust DC level at "KEY ON" is coming on to meet the specified value.  Just before alteration 250 mV 0 V DC

No.	**Item**	**Measuring instruments & Input signals**	**Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)**	**Adjustment procedure**

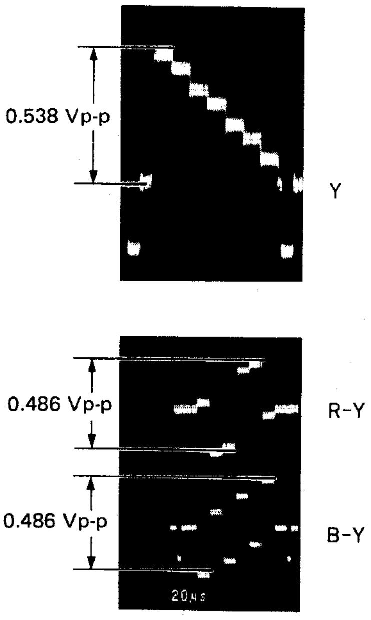
3.8 EFFECT AMPLIFIER ADJUSTMENT

Note: For the following procedure, refer to "Adjustment parts location of VIDEO board" on page 3-8 and "Adjustment parts location of KSG board" on page 3-34.
Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

- After this adjustment, it is necessary to perform "3.9 COLOR MATTE ADJUSTMENT" and "3.12 ENCODER ADJUSTMENT".

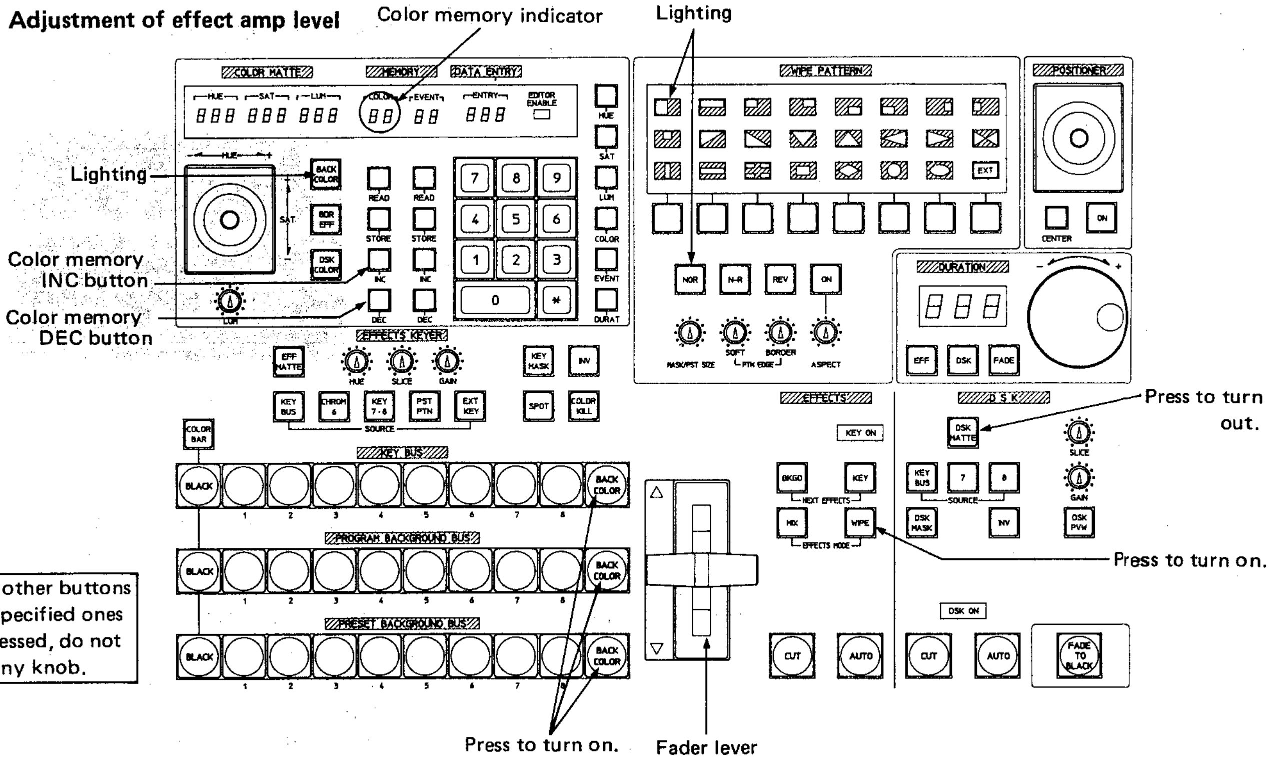
3.8.1 Coarse adjustment of built-in color bars

- Fine adjustments must be performed in the section 3.8.4.

1	Color bars level	Oscilloscope (H-rate: 10 : 1)	• Connect an extention board to the KSG board. ◎ TP1 [CP - 1A] Ⓣ C. BAR Y LEVEL (R19) [KSG - 2A] ☆ Y level: NTSC 0.538 Vp-p PAL 0.7 Vp-p ◎ TP11 [CP - 1A] Ⓣ C. BAR R-Y LEVEL (R23) [KSG - 2A] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p ◎ TP21 [CP - 1B] Ⓣ C. BAR B-Y LEVEL (R26) [KSG - 2A] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p	1) Remove the VIDEO board. 2) Take off the top cover so as to be able to see the CP board. 3) Confirm that "COLOR BARS" button on the control panel is lighting. If not, press the button to turn on. 4) Confirm the specified values are obtained at each test point. If the values are considerably different from specified ones, adjust these VRs to obtain specified values respectively. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

3.8.2 Adjustment of effect amp level


COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
DURAT
EFFECTS KEYER
EFF MATTE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7・8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
COLOR BAR
BLACK
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
WIPE PATTERN
EXT
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
POSITIONER
CENTER
DURATION
EFF
DSK
FADE
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
DSK MATTE
DSK MASK
DSK PVW
DSK ON
CUT
AUTO
FADE TO BLACK

Color memory indicator

Lighting

Lighting

Color memory INC button

Color memory DEC button

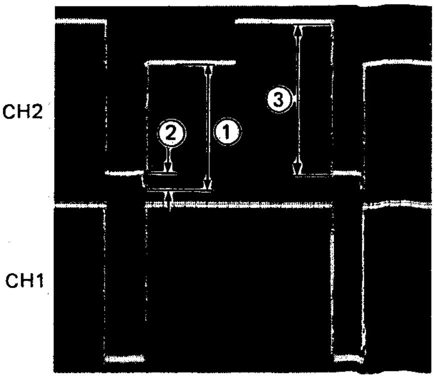
When other buttons than specified ones are pressed, do not turn any knob.

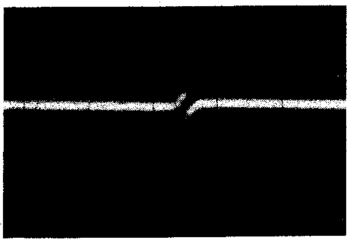
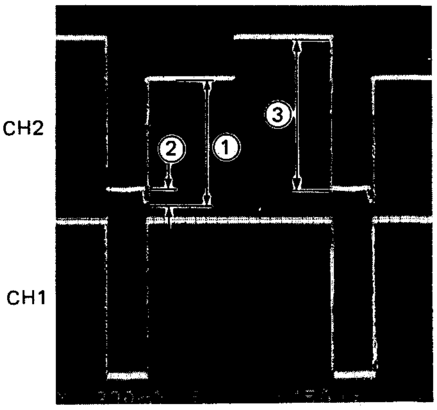
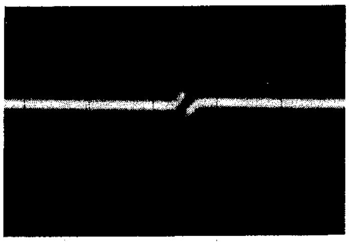
Press to turn out.

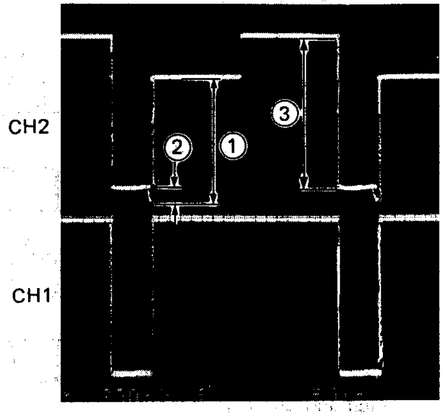
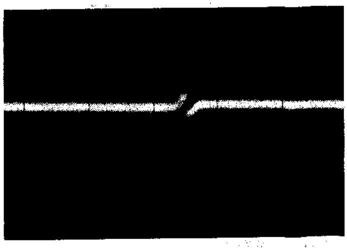
Press to turn on.

Press to turn on.

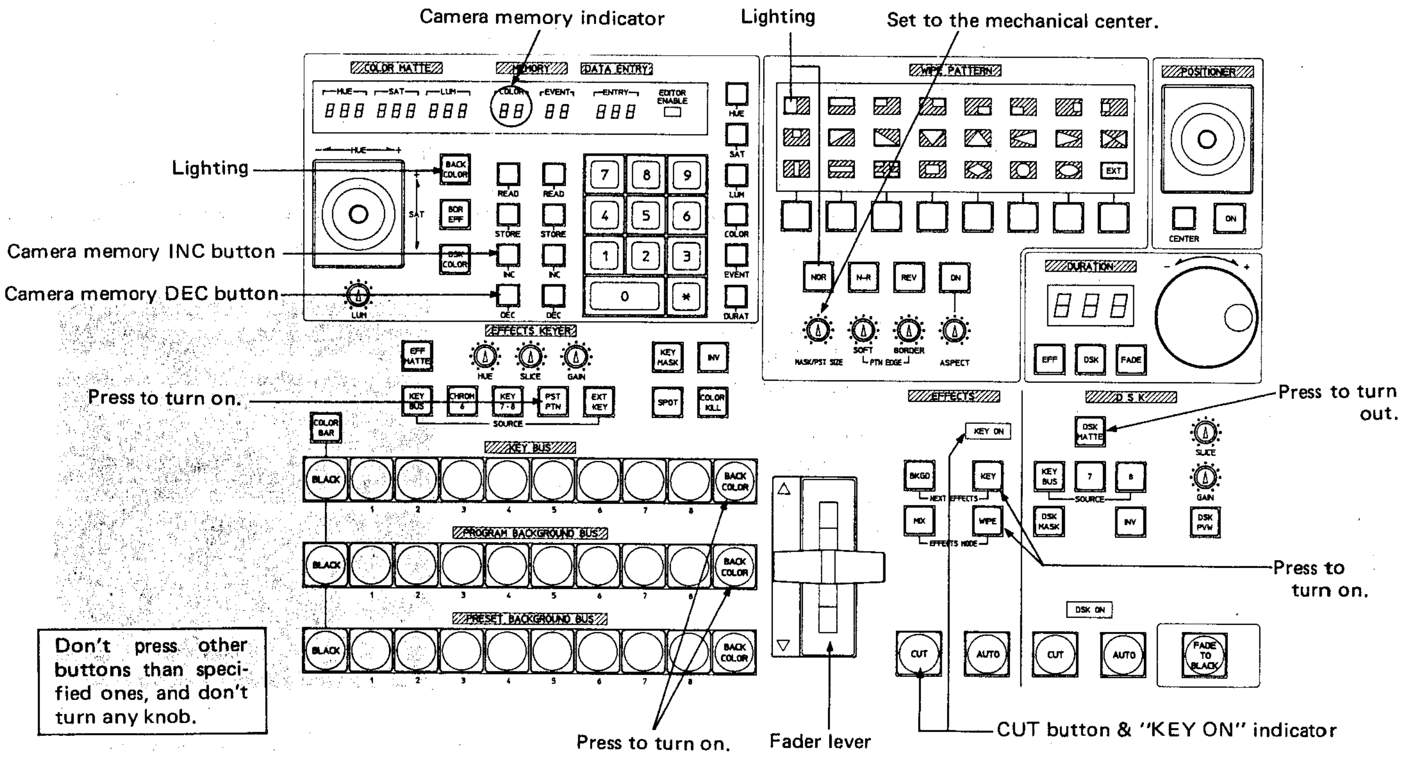
Fader lever

1	Border/wiper amp.	Oscilloscope (H-rate: 10 : 1, 200 mV/div.)		• Connect an extension board to the VIDEO board or take off the top cover to be able to see the VIDEO board from the top. 1) Move the Fader lever to the bottommost position, and reset the unit according to the procedure of Section 3.3. After this step, confirm that the unit has been completely reset. 2) Referring to the above figure set buttons on the panel. 3) Move the Fader lever to the mechanical center position. 4) Connect the oscilloscope to the test points.
	Y signal level		◎ TP23 [KEY - 2A] → ◎ TP1 [VIDEO - 4A] → Ⓣ TO Y GAIN (R6) [VIDEO - 4A] ☆ Adjust signal levels for left half. ·····① Ⓣ FROM Y PED (R5) [VIDEO - 4A] ☆ Adjust pedestal levels. ·····② Ⓣ FROM Y GAIN (R2) [VIDEO - 4A] ☆ Adjust signal levels for right half. ·····③	Oscilloscope's CH-1 Oscilloscope's CH-2 5) Press the INC or DEC button of the color memory to display "07" on the color memory indicator. 6) Adjust VRs to equalize the two signal levels as described on the left. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure
		Oscilloscope (20 mV/div.)	⌽ DIF 2 (R4) [VIDEO - 4A] ☆ Minimum serration around the border	7) Minimize serration around the border of left and right halves.  Extended view
	R-Y signal level	Oscilloscope (200 mV/div.)	◎ TP24 [KEY - 2A] ◎ TP8 [VIDEO - 3A] ⌽ TO R-Y GAIN (R106) [VIDEO - 3A] ☆ Adjust signal levels for left half. ·····①	8) Change the oscilloscope's connection as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 9) Press the color memory DEC button several times to display "02" on the color memory indicator. 10) Adjust VRs to equalize the two signal levels as described on the left. 
			⌽ FROM R-Y PED (R105) [VIDEO - 3A] ☆ Adjust pedestal levels. ·····②	
			⌽ FROM R-Y GAIN (R102) [VIDEO - 3A] ☆ Adjust signal levels for right half. ·····③	
		Oscilloscope (20mV/div.)	⌽ DIF 12 (R104 [VIDEO - 3A] ☆ Minimum serration around the border.	11) Minimize serration around the border of the left and right halves.  Extended view

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
	B-Y signal level	Oscilloscope (200 mV/div.)	◎ TP25 [KEY - 2A] ——→ Oscilloscope's CH-1 ◎ TP15 [VIDEO - 2A] ——→ Oscilloscope's CH-2 ⏀ TO B-Y GAIN (R206) [VIDEO - 2A] ☆ Adjust signal levels for left half. .....① ⏀ FROM B-Y PED (R205) [VIDEO - 2A] ☆ Adjust pedestal levels. .....② ⏀ FROM B-Y GAIN (R202) [VIDEO - 2A] ☆ Adjust signal levels for right half. .....③	12) Change the oscilloscope's connection as follows: TP25 → Oscilloscope's CH-1 TP15 → Oscilloscope's CH-2 13) Press the color memory DEC button to display "01" on the color memory indicator. 14) Adjust VRs to equalize the two signal levels as described on the left. 
		Oscilloscope (20 mV/div.)	⏀ DIF 22 (R204) [VIDEO - 2A] ☆ Minimum serration around the border.	15) Minimize serration around the border of the left and right halves.  Extended view

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure


COLOR MATTE
HUE
SAT
LUM
MEMORY
COLOR
EVENT
DATA ENTRY
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
EFFECTS KEYER
EFF MATTE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
COLOR BAR
DURAT
WIPE PATTERN
EXT
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
POSITIONER
CENTER
DURATION
EFF
DSK
FADE
EFFECTS
KEY ON
BKGD
KEY
MIX
WIPE
NEXT EFFECTS
EFFECTS MODE
DSK
DSK MATTE
DSK MASK
DSK PVW
DSK ON
KEY BUS
BLACK
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
CUT
AUTO
FADE TO BLACK

Camera memory indicator

Lighting

Set to the mechanical center.

Lighting

Camera memory INC button

Camera memory DEC button

Press to turn on.

Press to turn out.

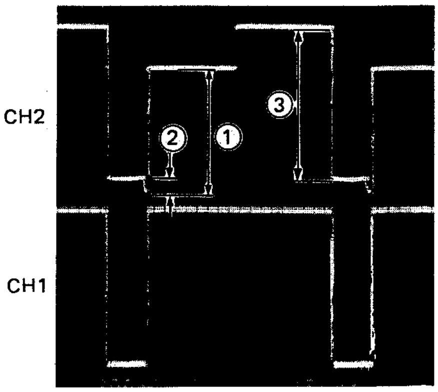
Press to turn on.

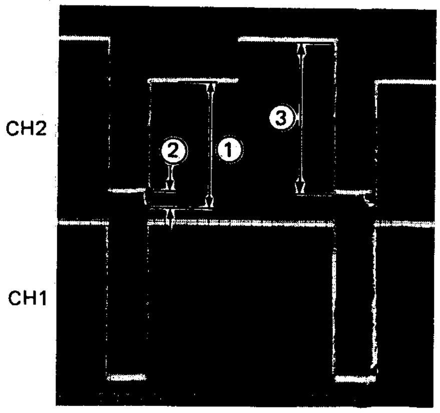
Don't press other buttons than specified ones, and don't turn any knob.

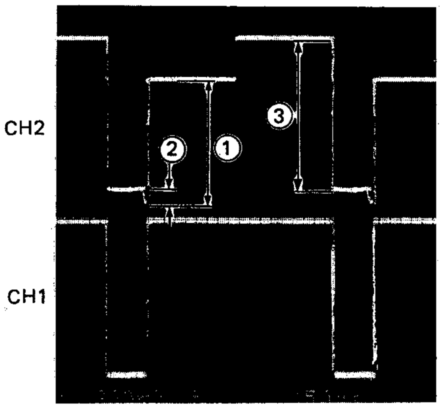
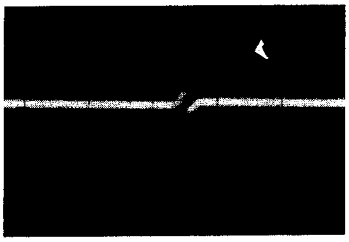
Press to turn on.

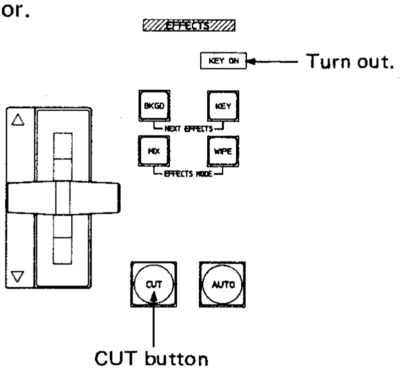
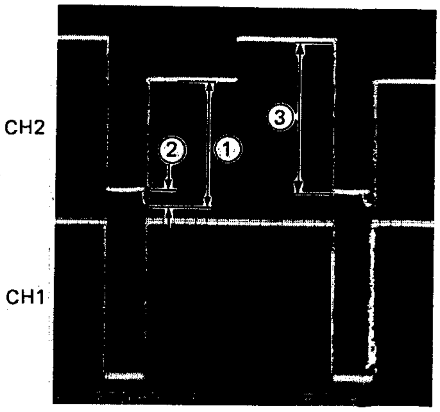
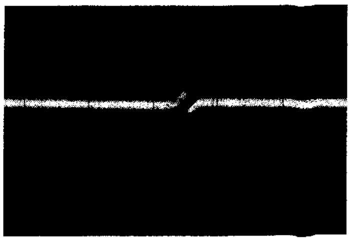
Fader lever

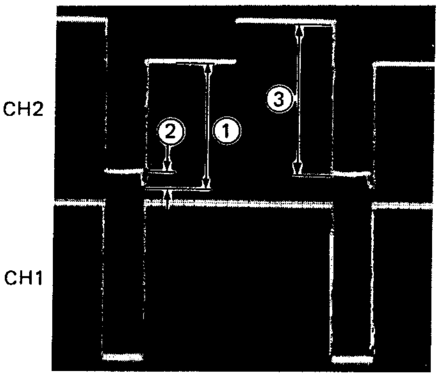
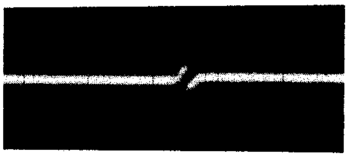
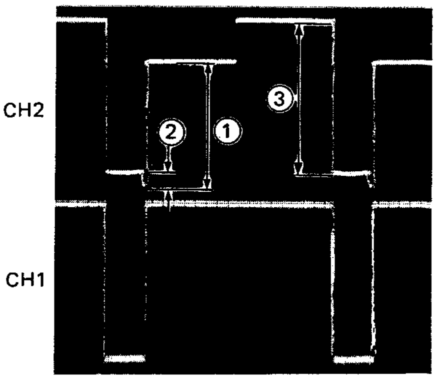
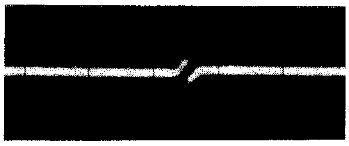
CUT button & "KEY ON" indicator

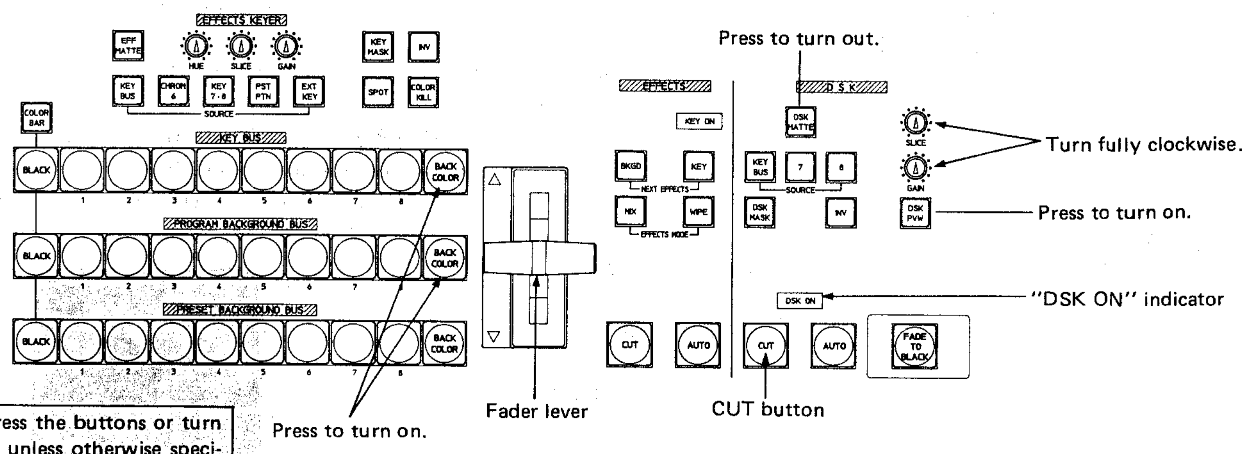
2	PGM (program) color killer/Effect key lamp	Oscilloscope (H-rate: 10 : 1 200 mV/div.)		1) Move the Fader lever to the bottommost position, and reset the unit according to the procedure of Section 3.3. After this, confirm that the reset condition takes place. 2) Referring to the above figure, set buttons and controls respectively. 3) Press the CUT button to turn on "KEY ON" indicator.
	Y signal level		◎ TP23 [KEY - 2A] ◎ TP2 [VIDEO - 4B]	4) Connect the oscilloscope to the test points as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 5) Press the color memory INC or DEC button to display "07" on the color memory indicator.
			⏀ KEY Y GAIN (R12) [VIDEO - 4B] ☆ Adjust signal level for right half. ·····①	6) Adjust VRs to equalize the two signal levels respectively as described on the left.
			⏀ BKGD Y PED (R11) [VIDEO - 4B] ☆ Adjust pedestal levels. ·····②	
			⏀ BKGD Y GAIN (R8) [VIDEO - 4B] ☆ Adjust signal level for left half. ·····③	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
		Oscilloscope (20 mV/div.)	Ⓣ DIF 4 (R10) [VIDEO - 4B] ☆ Minimum serration around the border.	7) Minimize serration around the border of the right and left halves. Extended view
	R-Y signal level	Oscilloscope (200 mV/div.)	◎ TP24 [KEY - 2A] ——→ Oscilloscope's CH-1 ◎ TP9 [VIDEO - 3B] ——→ Oscilloscope's CH-2 Ⓣ KEY R-Y GAIN (R112) [VIDEO - 3B] ☆ Adjust signal levels for right half. ·····① Ⓣ BKGD R-Y PED (R111) [VIDEO - 3B] ☆ Adjust pedestal levels. ·····② Ⓣ BKGD R-Y GAIN (R108) [VIDEO - 3B] ☆ Adjust signal levels for left half. ·····③	8) Change the oscilloscope's connection as follows: 9) Press the color memory DEC button several times to display "02" on the color memory indicator. 10) Adjust VRs to equalize the two signal levels respectively as described on the left. 
		Oscilloscope (20 mV/div.)	Ⓣ DIF 14 (R110) [VIDEO - 3B] ☆ Minimum serration around the border.	11) Minimize serration around the border of the left and right halves. Extended view

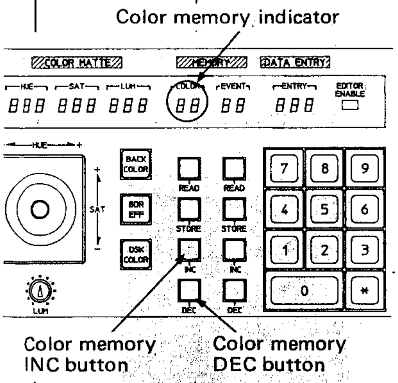
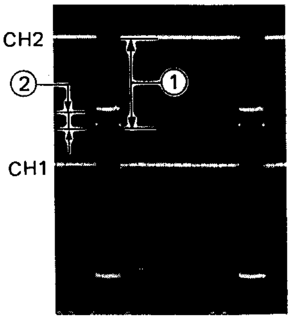
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
	B-Y signal level	Oscilloscope (200 mV/div.)	◎TP25 [KEY - 2A] ——→ Oscilloscope's CH-1 ◎TP16 [VIDEO - 2B] ——→ Oscilloscope's CH-2 Ⓣ KEY B-Y GAIN (R212) [VIDEO - 2B] ☆ Adjust signal levels for right half. ·····① Ⓣ BKGD B-Y PED (R211) [VIDEO - 2B] ☆ Adjust pedestal levels. ·····② Ⓣ BKGD B-Y GAIN (R208) [VIDEO - 2B] ☆ Adjust signal levels for left half. ·····③	12) Change the oscilloscope's connection as follows: 13) Press the color memory DEC button to display "01" on the color memory indicator. 14) Adjust VRs to equalize the two signal levels respectively as described on the left. 
		Oscilloscope (20 mV/div.)	Ⓣ DIF 24 (R210) [VIDEO - 2B] ☆ Minimum serration around the border.	15) Minimize serration around the border of the right and left halves.  Extended view

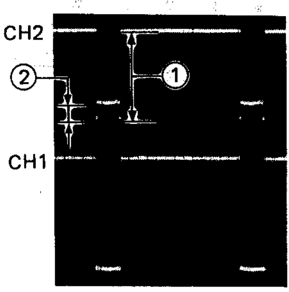
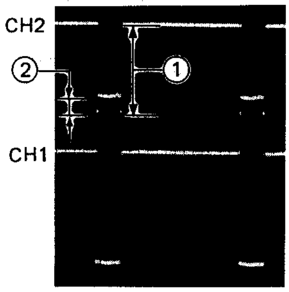
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	PVW (pre-view) color killer/Effect key amp	Oscilloscope (H-rate: 10 : 1, 200 mV/div.)		• Proceed to do this adjustment following the previous step 2. 1) Press the CUT button to turn out "KEY ON" indicator.  EFFECTS KEY ON Turn out. BKGD KEY NEXT EFFECTS MIX WIPE EFFECTS MODE CUT AUTO CUT button
	Y signal level		◎ TP23 [KEY - 2A] ◎ TP5 [VIDEO - 4B]	2) Connect the oscilloscope to the test points as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 3) Press the INC button to display "07" on the color memory indicator.
			Ⓣ KYPV Y GAIN (R24) [VIDEO - 4B] ☆ Adjust signal levels for right half. ·····①	4) Adjust VRs to equalize the two signal levels respectively as described on the left. 
			Ⓣ BKPV Y PED (R23) [VIDEO - 4B] ☆ Adjust pedestal levels. ·····②	
			Ⓣ BKPV Y GAIN (R20) [VIDEO - 4B] ☆ Adjust signal levels for left half. ·····③	
		Oscilloscope (20 mV/div.)	Ⓣ DIF 8 (R22) [VIDEO - 4B] ☆ Minimum serration around the border.	5) Minimize serration around the border of the right and left halves.  Extended view

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
	R-Y signal level	Oscilloscope (200 mV/div.)	◎ TP24 [KEY - 2A] ◎ TP12 [VIDEO - 3B] Ⓣ KYPV R-Y GAIN (R124) [VIDEO - 3B] ☆ Adjust signal levels for right half. ·····①	6) Connect the oscilloscope to the test points as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 7) Press the DEC button to display "02" on the color memory indicator. 8) Adjust the two signal levels with specified VRs respectively. 
			Ⓣ BKPV R-Y PED (R123) [VIDEO - 3B] ☆ Adjust pedestal levels. ·····②	
			Ⓣ BKPV R-Y GAIN (R120) [VIDEO - 3B] ☆ Adjust signal levels for left half. ·····③	
		Oscilloscope (20 mV/div.)	Ⓣ DIF 18 (R122) [VIDEO - 3B] ☆ Minimum serration around the border.	9) Minimize serration around the border of the right and left halves.  Extended view
	B-Y signal level	Oscilloscope (200 mV/div.)	◎ TP25 [KEY - 2A] ◎ TP19 [VIDEO - 2B] Ⓣ KYPV B-Y GAIN (R224) [VIDEO - 2B] ☆ Adjust signal levels for right half. ·····①	10) Connect the oscilloscope's connection as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 11) Press the DEC button to display "01" on the color memory indicator. 12) Adjust the two signal levels with specified VRs respectively. 
			Ⓣ BKPV B-Y PED (R223) [VIDEO - 2B] ☆ Adjust pedestal levels. ·····②	
			Ⓣ BKPV B-Y GAIN (R220) [VIDEO - 2B] ☆ Adjust signal levels for left half. ·····③	
		Oscilloscope (20 mV/div.)	Ⓣ DIF 28 (R222) [VIDEO - 2B] ☆ Minimum serration around the border.	13) Minimize serration around the border of the right and left halves.  Extended view


EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY MASK
INV
COLOR BAR
KEY BUS
CHROM 6
KEY 7・8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
KEY BUS
BLACK
BACK COLOR
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
D S K
DSK MATTE
KEY BUS
7
8
SOURCE
DSK MASK
INV
SLICE
GAIN
DSK PVW
DSK ON
CUT
AUTO
FADE TO BLACK
Press to turn out.
Turn fully clockwise.
Press to turn on.
"DSK ON" indicator
Press to turn on.
Fader lever
CUT button

Do not press the buttons or turn the knobs unless otherwise specified.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
4	DSK amp. Y signal level  Color memory indicator COLOR MATTE MEMORY DATA ENTRY HUE SAT LUM COLOR EVENT ENTRY EDITOR ENABLE BACK COLOR BDR EFF DSK COLOR READ STORE INC DEC 7 8 9 4 5 6 1 2 3 0 * Color memory INC button Color memory DEC button	Oscilloscope (H-rate: 10 : 1, 200 mV/div.)	◎ TP23 [KEY - 2A] → Oscilloscope's CH-1 ◎ TP3 [VIDEO - 4C] → Oscilloscope's CH-2 ⏀ DSK Y GAIN (R15) [VIDEO - 4B] ☆ Adjust peak levels. .....① ⏀ EFF Y GAIN (R14) [VIDEO - 4B] ☆ Adjust pedestal levels. .....② ◎ TP6 [VIDEO - 4B] → Oscilloscope's CH-2 ⏀ DKPV Y GAIN (R27) [VIDEO - 4B] ☆ Adjust peak levels. .....① ⏀ EFPV Y GAIN (R26) [VIDEO - 4B] ☆ Adjust pedestal levels. .....②	1) Set the Fader lever to the lowest position and reset the unit according to the procedure described in Section 3.3. After the setting, confirm that the unit has been in reset mode. 2) Set buttons and controls referring to the above figure. 3) Press the CUT button to turn on "DSK ON" indicator. 4) Connect the oscilloscope to the test points as follows: 5) Press the color memory INC or DEC button to select "07" on the color memory indicator. 6) Adjust the two signal levels with VRs specified on the left.  7) Change the oscilloscope's connection as follows: 8) In the same manner as in the above step 5), adjust the two signal levels.

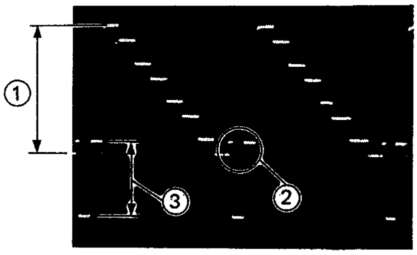
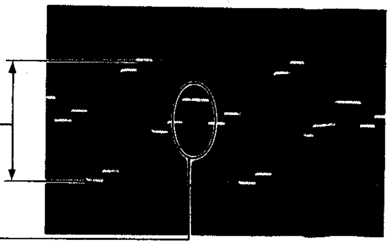
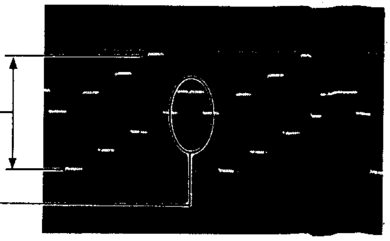
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
	R-Y signal level	Oscilloscope (H-rate, 10 : 1)		9) Change the oscilloscope's connection as follows:
			◎ TP24 [KEY - 2A] →	Oscilloscope's CH-1
			◎ TP10 [VIDEO - 3C] →	Oscilloscope's CH-2
				10) Press the DEC button to select "02" on the color memory indicator.
			⦶ DSK R-Y GAIN (R115) [VIDEO - 3B] ☆ Adjust peak levels. ·····①	11) Adjust the two signal levels with VRs specified on the left, respectively.
			⦶ EFF R-Y GAIN (R114) [VIDEO - 3B] ☆ Adjust pedestal levels. ·····②	
				12) Change the oscilloscope's CH-2 connection as follows:
			◎ TP13 [VIDEO - 3B] →	Oscilloscope's CH-2
			⦶ DKPV R-Y GAIN (R127) [VIDEO - 3B] ☆ Adjust peak levels. ·····①	13) In the same manner as in the step 9), adjust the two signal levels.
			⦶ EFFPV R-Y GAIN (R126) [VIDEO - 3B] ☆ Adjust pedestal levels. ·····②	
	B-Y signal level			14) Change the oscilloscope's connection as follows:
			◎ TP25 [KEY - 2A] →	Oscilloscope's CH-1
			◎ TP17 [VIDEO - 2C] →	Oscilloscope's CH-2
				15) Press the DEC button to select "01" on the color memory indicator.
			⦶ DSK B-Y GAIN (R215) [VIDEO - 2B] ☆ Adjust peak levels. ·····①	16) Adjust the two signal levels with VRs specified on the left, respectively.
			⦶ EFF B-Y GAIN (R214) [VIDEO - 2B] ☆ Adjust pedestal levels. ·····②	
				17) Change the oscilloscope's CH-2 connection to TP20.
			◎ TP20 [VIDEO - 2B] →	Oscilloscope's CH-2
			⦶ DPV B-Y GAIN (R227) [VIDEO - 2B] ☆ Adjust peak levels. ·····①	18) In the same manner as in the step 16), adjust the two signal levels.
			⦶ EFFPV B-Y GAIN (R226) [VIDEO - 2B] ☆ Adjust pedestal levels. ·····②	

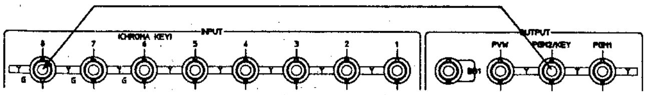
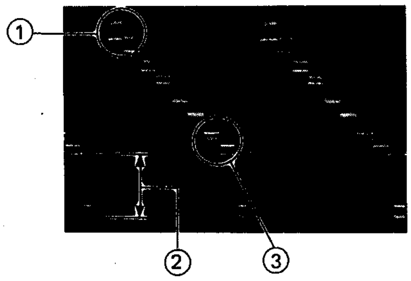
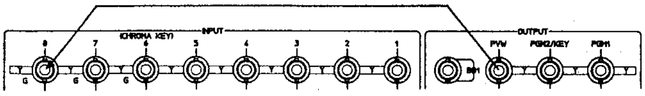
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

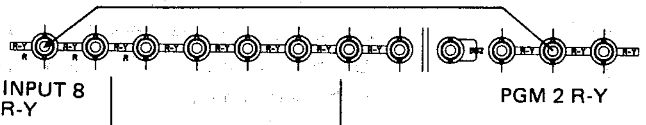
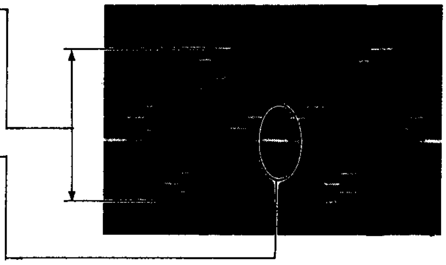
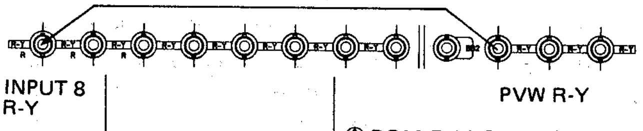
3.8.3 Adjustment of component output level

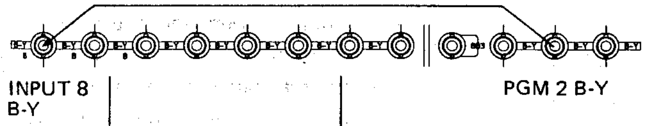
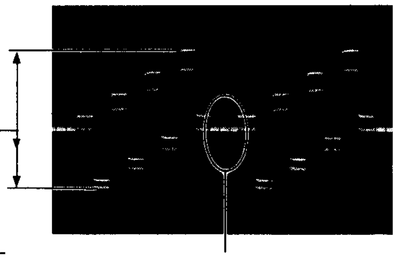
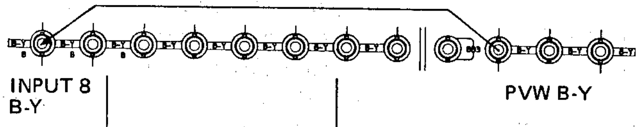
- The output component (PGM Y/R-Y/B-Y) level becomes equal to the input (INPUT 1 to 8) level by performing this adjustment.

Note: Adjustments of this section should take place after every item of Sections 3.8.1 and 3.8.2 has been completely adjusted.

1	Rough adjustment	Oscilloscope (H-rate, 10 : 1) or Waveform monitor	◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PGM Y GAIN (R17) [VIDEO - 4C] ☆ Adjust white level (0.54 Vp-p). .....① Ⓣ PGM Y PED (R18) [VIDEO - 4C] ☆ Make pedestal level flat. .....② Ⓣ PGM SYNC (R31) [VIDEO - 4C] ☆ Adjust sync. level (0.28 Vp-p). .....③	1) Remove the top cover to be able to see the VIDEO board. 2) Connect an extension board to the CP board for easy adjustment. 3) Move the FADER lever to the bottommost position, and reset the whole unit according to the procedure of Section 3.3. After the reset, confirm that color bars signal is output on the monitor (PGM and PVW). 4) Perform rough adjustment of Y signal levels with specified VRs. 
			◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PGM R-Y GAIN (R117) [VIDEO - 3C] ☆ Adjust peak level (0.53 Vp-p). Ⓣ PGM R-Y PED (R118) [VIDEO - 3C] ☆ Make pedestal level flat.	5) Perform rough adjustment of R-Y signal levels with specified VRs. 
			◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PGM B-Y GAIN (R217) [VIDEO - 2C] ☆ Adjust peak level (0.53 Vp-p). Ⓣ PGM B-Y PED (R218) [VIDEO - 2C] ☆ Make pedestal level flat.	6) Perform rough adjustment of B-Y signal levels with specified VRs. 

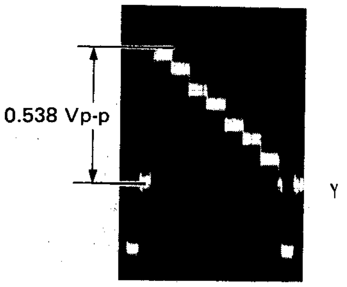
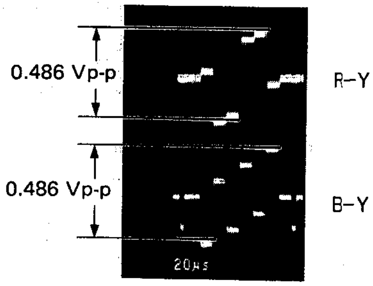
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
2	Y signal output level	Oscilloscope	 (CHROMA KEY) INPUT 8 7 6 5 4 3 2 1 G OUTPUT PVW PGM2/KEY PGM1 ◎ PGM 1 Y OUTPUT[Rear panel] (with 75-ohm terminator) TP9 [CP - 2C] Ⓣ Oscilloscope's calibrator ☆ Equalize two signal levels.	• If J7 of the CP board is set to the side of G8, reset it to Y8 side. • If J1 of the VIDEO board is set to the side of KEY Y, reset it to PGM Y side. 1) Press the PRESET BACKGROUND BUS button to select "INPUT 8". 2) Shortcircuit between the PGM 2 Y OUTPUT connector and INPUT 8 Y connector of the main unit's rear panel. 3) Connect the oscilloscope's probes as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 4) Adjust the oscilloscope's calibrator to equalize signal levels of the two channels. **Note:** Do not turn the calibrator knob until the following adjustments for Y signal level finishes.
			◎ PVW Y OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ PVW Y GAIN (R29) [VIDEO - 4C] ☆ Equalize Y signal levels. ·····①	5) Change the oscilloscope's CH-1 connection to PVW Y OUTPUT connector. → Oscilloscope's CH-1 6) Adjust VRs to equalize the two channels' Y and pedestal levels, respectively. 
			Ⓣ PVW Y PED (R30) [VIDEO - 4C] ☆ Equalize pedestal levels. ·····②	
			Ⓣ PVW SYNC (R32) [VIDEO - 4C] ☆ 0.3 V (SYNC level) ·····③	7) Adjust R32 so that sync level of PVW Y output meets the specified value (0.3 V).
			◎ PGM 1 Y OUTPUT [Rear panel] (with 75-ohm terminator)  (CHROMA KEY) INPUT 8 7 6 5 4 3 2 1 G OUTPUT PVW PGM2/KEY PGM1 Ⓣ PGM Y GAIN (R17) [VIDEO - 4C] ☆ Equalize Y signal levels. ·····①	8) Press the PRESET BACKGROUND BUS button to select "COLOR BAR". 9) Select "INPUT 8" with the PROGRAM BACKGROUND BUS button. 10) Change the oscilloscope's CH-1 connection as follows: → Oscilloscope's CH-1 11) Shortcircuit between PVW Y OUTPUT connector and INPUT 8 Y connector. 12) In the same manner as the step 6), adjust VRs to equalize Y levels and pedestal levels of the two channels, respectively. 13) Adjust R31 so that sync level of PGM 1 Y output meets the specified value (0.3 V). **Note:** In the case J7 (CP board) or J1 (VIDEO board) was turned at the first stage, turn it back to the original position.
			Ⓣ PGM Y PED (R18) [VIDEO - 4C] ☆ Equalize pedestal levels. ·····②	
			Ⓣ PGM SYNC (R31) [VIDEO - 4C] ☆ 0.3 V (sync level) ·····③	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	R-Y signal output level 		◎ PGM 1 R-Y OUTPUT → Oscilloscope's CH-1 [Rear panel - Main unit] (with 75-ohm terminator) ◎ TP19 [CP - 2C] → Oscilloscope's CH-2 Ⓣ Oscilloscope's calibrator ☆ Equalize two signal levels.	• If J8 of the CP board is set to the side of R8, turn it to R-Y 8 side. • If J2 of the VIDEO board is set to the side of KEY R-Y, reset it to PGM R-Y side. 1) Select "COLOR BAR" by pressing the PROGRAM BACKGROUND BUS button. 2) Press the PRESET BACKGROUND BUS button to select "INPUT 8". 3) Shortcircuit between the PGM 2 R-Y OUTPUT connector and INPUT 8 R-Y connector on the rear panel of the main unit. 4) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 5) Adjust the oscilloscope's calibrator to equalize signal levels of the two channels. **Note:** Do not turn the calibrator knob until the following adjustment of R-Y signal level is completed.
			◎ PVW R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) → Oscilloscope's CH-1 Ⓣ PVW R-Y GAIN (R129) [VIDEO - 3C] ☆ Adjust peak levels.	6) Change the oscilloscope's CH1 connection to the PVW R-Y OUTPUT connector. → Oscilloscope's CH-1 7) Adjust VRs to equalize peak and pedestal levels of the two channels, respectively. 
			Ⓣ PVW R-Y PED (R130) [VIDEO - 3C] ☆ Adjust pedestal levels.	
			◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) → Oscilloscope's CH-1	8) Press the PRESET BACKGROUND BUS button to select "COLOR BAR" signal. 9) Select "INPUT 8" by pressing the PROGRAM BACKGROUND BUS button. 10) Change the oscilloscope's CH-1 connection to the PGM 1 R-Y OUTPUT connector. → Oscilloscope's CH-1 11) Shortcircuit between the PVW R-Y OUTPUT connector and INPUT 8 R-Y connector. 12) In the same manner as the step 7), adjust VRs to equalize peak levels and pedestal levels of the two channels respectively on the oscilloscope. **Note:** In the case J8 (CP board) or J2 (VIDEO board) was turned at the first stage, set it back to the original position.
			Ⓣ PGM R-Y GAIN (R117) [VIDEO - 3C] ☆ Adjust peak levels.	
			Ⓣ PGM R-Y PED (R118) [VIDEO - 3C] ☆ Adjust pedestal levels.	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
4	B-Y signal output level			• If J9 of the CP board is set to the side of B8, turn it to B-Y 8 side. • If J3 of the VIDEO board is set to the side of KEY B-Y, turn it to PGM B-Y side. 1) Select "COLOR BAR" by pressing the PROGRAM BACKGROUND BUS button. 2) Press the PRESET BACKGROUND BUS button to select "INPUT 8". 3) Shortcircuit between the PGM 2 B-Y OUTPUT connector and INPUT 8 B-Y connector on the rear panel of the main unit.
			◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ◎ TP29 [CP - 2C] Ⓣ Oscilloscope's calibrator ☆ Equalize two signal levels.	4) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 5) Adjust the oscilloscope's calibrator to equalize signal levels of the two channels. **Note:** Do not turn the calibrator knob until the following adjustment of B-Y signal level is completed.
			◎ PVW B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PVW B-Y GAIN (R229) [VIDEO - 2C] ☆ Adjust peak levels.	6) Change the oscilloscope's CH-1 connection to the PVW B-Y OUTPUT connector. → Oscilloscope's CH-1 7) Adjust VRs to equalize peak and pedestal levels of the two channels, respectively.
			Ⓣ PVW B-Y PED (R230) [VIDEO - 2C] ☆ Adjust pedestal levels.	
			◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator)	8) Press the PRESET BACKGROUND BUS button to select "COLOR BAR" signal. 9) Select "INPUT 8" by pressing the PROGRAM BACKGROUND BUS button. 10) Change the oscilloscope's CH-1 connection to the PGM 1 B-Y OUTPUT terminal. → Oscilloscope's CH-1
			Ⓣ PGM B-Y GAIN (R217) [VIDEO - 2C] ☆ Adjust peak levels. Ⓣ PGM B-Y PED (R218) [VIDEO - 2C] ☆ Adjust pedestal levels.	11) Shortcircuit between the PVW B-Y OUTPUT connector and INPUT 8 B-Y connector. 12) In the same manner as the step 7), adjust VRs to equalize peak levels and pedestal levels of the two channels respectively on the oscilloscope. **Note:** In the case J9 (CP board) or J3 (VIDEO board) was turned at the first stage, set it back to the original position.

3.8.4 Fine adjustment of built-in color bars (component output)

Note: Adjustments of this section should take place after every item of the section 3.8.1 to 3.8.3 has been completely adjusted.

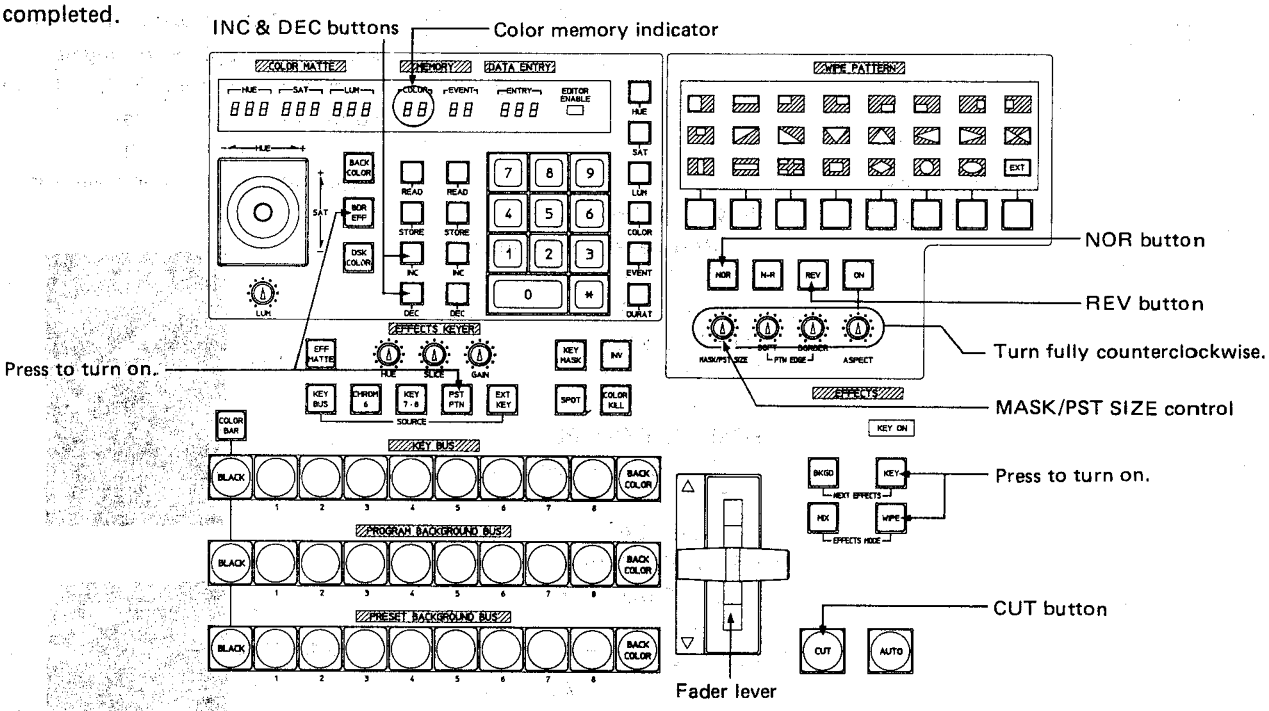
No.	Item	Measuring instruments & Input signals	Measuring point ( ) Adjustment parts ( ) Adjustment level (☆)	Adjustment procedure
1	Color bars level adjustment	Oscilloscope (H-rate: 10 : 1)	◎ PGM 1 OUTPUT [Rear panel - Main unit] ⏀ C. BAR Y LEVEL (R19) [KSG - 2A] ☆ NTSC : 0.538 Vp-p PAL : 0.7 Vp-p - - - - - - - - - - - - - - - - - - - ◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] ⏀ C. BAR R-Y LEVEL (R23) [KSG - 2A] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p - - - - - - - - - - - - - - - - - - - ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] ⏀ C. BAR B-Y LEVEL (R26) [KSG - 2A] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p	1) Extend the KSG board by using the extension board. 2) Set the Fader lever to the lowest position and reset the unit according to the procedure described in Section 3.3. After the setting, confirm that the unit has been in reset mode. (Color bars signal is output.) 3) Adjust for the specified level respectively.  

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

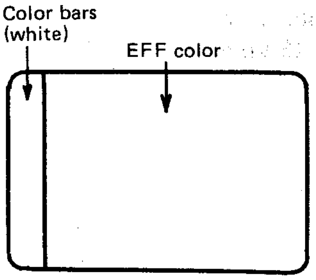
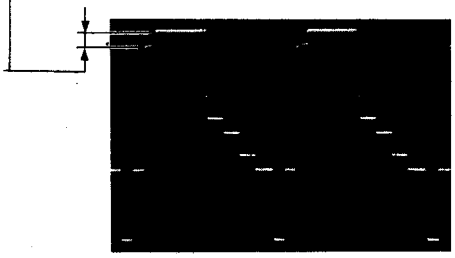
3.9 COLOR MATTE ADJUSTMENT

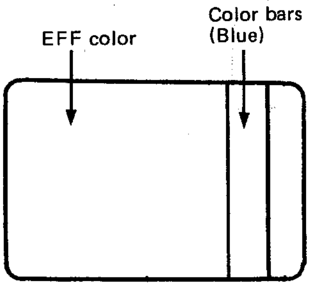
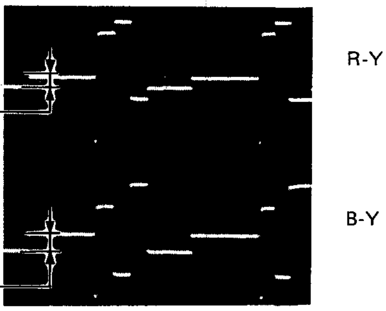
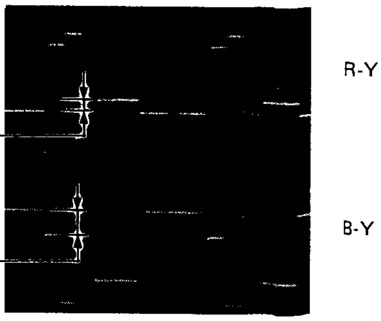
Note: For the following procedure, refer to "Adjustment parts location of VIDEO board" on page 3-8.
Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

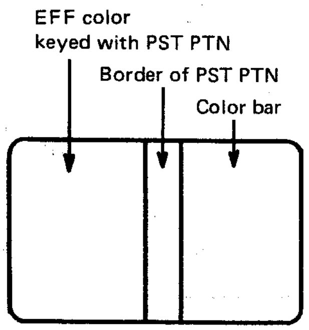
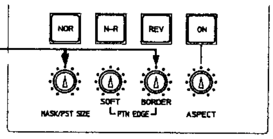
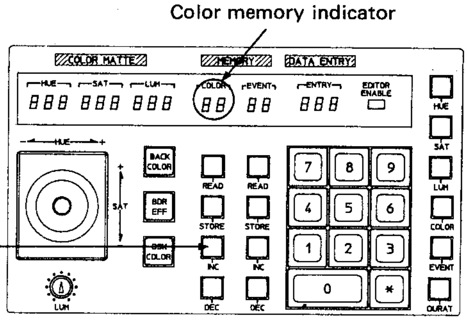
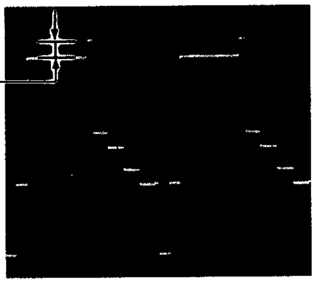
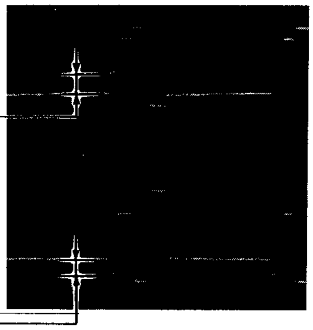
- For the following adjustments, it is the first condition that the adjustment of "3.8 EFFECT AMPLIFIER ADJUSTMENT" has been completed.

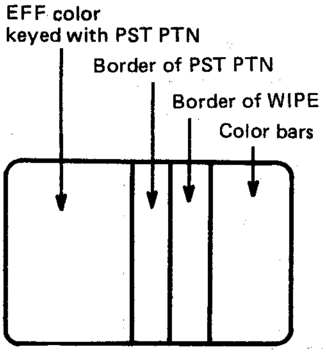
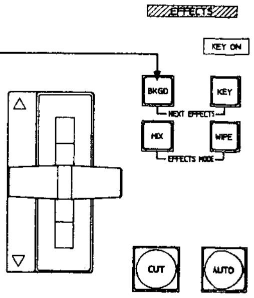
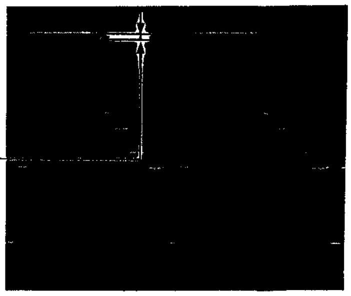
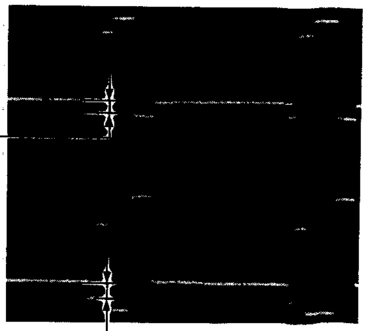

INC & DEC buttons
Color memory indicator
COLOR MATTE
MEMORY
DATA ENTRY
WIPE PATTERN
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
DURAT
NOR button
REV button
Turn fully counterclockwise.
MASK/PST SIZE control
Press to turn on.
EFFECTS KEYER
EFF MATTE
GAIN
KEY MASK
INV
KEY BUS
CHROM
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
COLOR BAR
KEY BUS
BLACK
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
Press to turn on.
CUT button
CUT
AUTO
Fader lever
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
EXT

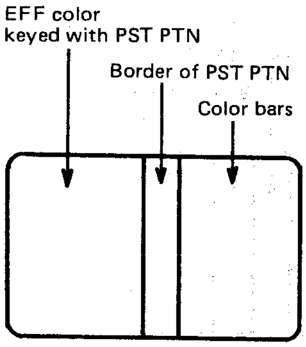
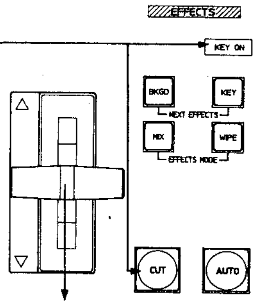
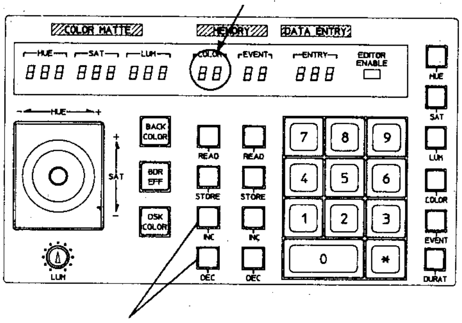
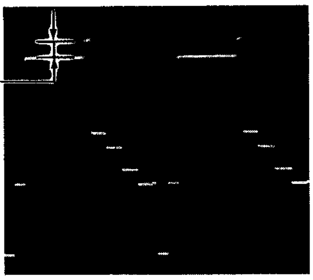
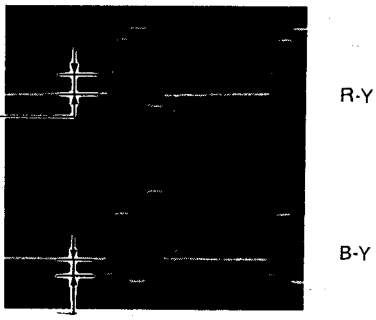
3.9.1 BDR/EFF color adjustment

1	EFF (Effect Mat) color	Oscilloscope (H-rate, 10 : 1)	 Color bars (white) EFF color Condition on the PGM monitor. ** NTSC : 07 PAL : 08 ◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⏀ BORDER Y GAIN (R319) [KEY - 1B] ☆ Equalize to white level of color bars signal.	1) Connect an extension board to the KEY board for easy adjustment. 2) Set the Fader lever to the lowest position and reset the whole unit according to the procedure described in Section 3.3. 3) Set buttons and controls as shown in the figure on the top. 4) Press the CUT button to turn on "KEY ON". 5) Press the REV button to turn on. While observing the program monitor, adjust the MASK/PST SIZE control to align both borders of color bars white and keyed color (EFF color). 6) Select " ** " on the color memory indicator with the color memory INC or DEC button. (EFF color becomes white.) 7) Adjust R319 so that keyed EFF color level (white) coincides with white level of color bars signal. 

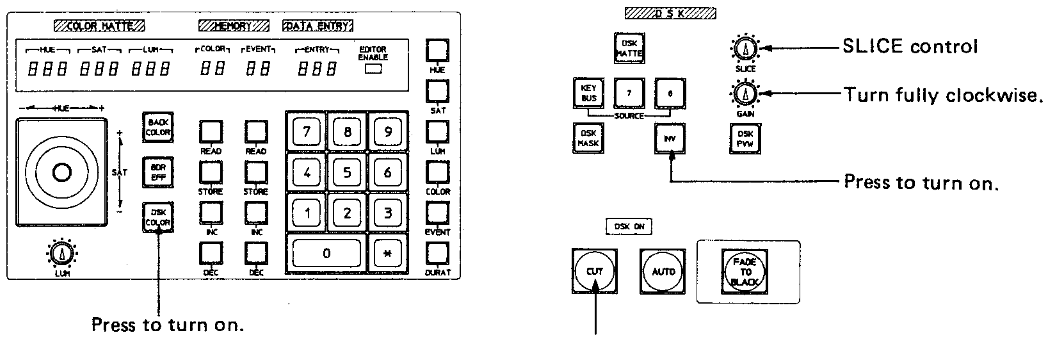
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
		Oscilloscope (H-rate, 10 : 1)	◎ PGM 1 R-Y OUTPUT ◎ PGM 1 B-Y OUTPUT [Rear panel - Mainframe] (with 75-ohm terminator) ⦶ BORDER BL (R322) [KEY - 1B] ☆ Mechanical center  Condition on the PGM monitor	8) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 9) Set R322 (BORDER BL) to the mechanical center. 10) Press the NOR button to turn on. While observing the program monitor, adjust the MASK/PST SIZE control to align both borders of color bars blue and keyed EFF color (white). 11) By pressing the color memory DEC button select "00" on the color memory indicator. (EFF color becomes black.)
			⦶ BORDER R-Y GAIN (R320) [KEY - 1B] ☆ Equzlize to blanking level.	12) Adjust VRs so that keyed EFF (black) level coincides with the blanking level. 
			⦶ BORDER B-Y GAIN (R321) [KEY - 1B] ☆ Equalize to blanking level.	
			⦶ BORDER BL (R322) [KEY - 1B] ☆ Same or proximity to that of color bars signal	13) Press the color memory DEC button to select "01" on the color memory indicator. (EFF color turns into blue.) 14) Adjust the keyed EFF color (blue) level so that it becomes the same or proximate to the blue level of color bars signal.  15) Repeat the steps 11) through 14) until the keyed color (blue) level coincides with the blue level of the color bars signal.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
2	BDR (Border) color with PST PTN (PGM output)	Oscilloscope (H-rate, 10 : 1)	 EFF color keyed with PST PTN Border of PST PTN Color bar Condition of PGM monitor ** NTSC : 07 PAL : 08 ◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ K BOD Y GAIN (R9) [VIDEO - 4B] ☆ Equalize to EFF color level. ◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ K BOD R-Y GAIN (R109) [VIDEO - 3B] ☆ Equalize to blanking level. ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ K BOD B-Y GAIN (R209) [VIDEO - 2B] ☆ Equalize to blanking level.	1) For easy adjustment, connect an extension board to the VIDEO board, or take off the top cover to see the board directly. 2) Set buttons and controls referring to the previous item No. 1 (EFF color adjustment), steps 2) through 4). 3) Set the BORDER and MASK/PST size controls to the center position.  NOR N-R REV ON MASK/PST SIZE SOFT BORDER PTN EDGE ASPECT 4) Select " ** " on the color memory indicator by pressing the INC button.  Color memory indicator COLOR MATTE MEMORY DATA ENTRY HUE SAT LUM COLOR EVENT ENTRY EDITOR ENABLE BACK COLOR BDR EFF BKG COLOR READ STORE INC DEC 7 8 9 4 5 6 1 2 3 0 * HUE SAT LUM COLOR EVENT DURAT LUM 5) Adjust R9 to equalize the border color level to the keyed EFF color level.  6) Press the DEC button several times to select "00" on the color memory indicator. 7) Equalize the level of border color (black) to the blanking level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	BDR (Border) color at WIPE	Oscilloscope (H-rate, 10 : 1)	 EFF color keyed with PST PTN Border of PST PTN Border of WIPE Color bars Condition of PGM monitor ** NTSC : 07 PAL : 08	8) Press the INC button several times to select " ** " on the color memory indicator. 9) Press the BKGD button.  EFFECTS KEY ON BKGD KEY NEXT EFFECTS MIX WIPE EFFECTS MODE CUT AUTO 10) Move the Fader lever to align both borders of WIPE pattern and PST pattern. 11) Equzlize level of WIPE border to that of PST PTN border.
			◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ BOD Y GAIN (R3) [VIDEO - 4A] ☆ Equalize border levels.	
			◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ BOD R-Y GAIN (R103) [VIDEO - 3A] ☆ To be same as blanking level ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ BOD B-Y GAIN (R203) [VIDEO - 2A] ☆ To be same as blanking level.	12) Press the DEC button several times to select "00" on the color memory indicator. 13) Adjust black level of WIPE border so as to be the same as the blanking level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
4	BDR (Border) color with PST PTN (Preview output)	Oscilloscope (H-rate, 10 : 1)	 EFF color keyed with PST PTN Border of PST PTN Color bars Condition of PVW monitor ** NTSC : 07 PAL : 08	14) Press the CUT button to turn out after setting the Fader lever fully to the bottom.  EFFECTS KEY ON BKGD KEY NEXT EFFECTS MIX WIPE EFFECTS MODE CUT AUTO Set it bottommost. 15) The preview monitor is in the condition as shown on the left. 16) Press the INC button several times to select " ** " on the color memory indicator. Color memory indicator  COLOR MATTE MEMORY DATA ENTRY HUE SAT LUM COLOR EVENT ENTRY EDITOR ENABLE BACK COLOR BDR EFF DSK COLOR READ STORE INC DEC 7 8 9 4 5 6 1 2 3 0 * DURAT INC & DEC buttons
			◎ PVW Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⦶ BOPV Y GAIN (R21) [VIDEO - 4B] ☆ Equalize to EFF color level.	17) Adjust level of border color so as to coincide with keyed EFF color level. 
			◎ PVW R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⦶ BOPV R-Y GAIN (R121) [VIDEO - 3B] ☆ Equalize to blanking level. - - - - - - - - - - - - - - - - - ◎ PVW B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⦶ BOPV B-Y GAIN (R221) [VIDEO - 2B] ☆ Equalize to blanking level.	18) Press the DEC button several times to select "00" for color memory. 19) Adjust black level of border color so as to coincide with blanking level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure



SLICE control

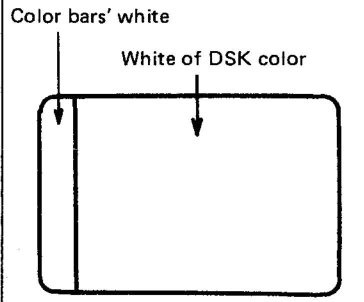
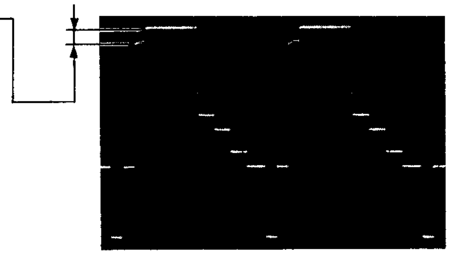
Turn fully clockwise.

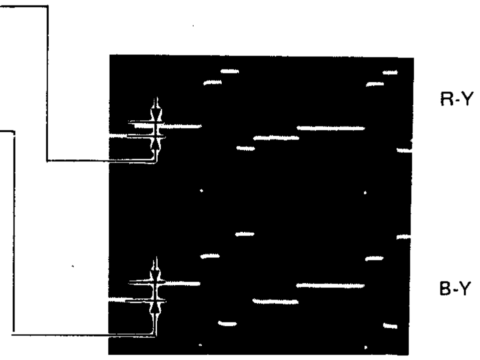
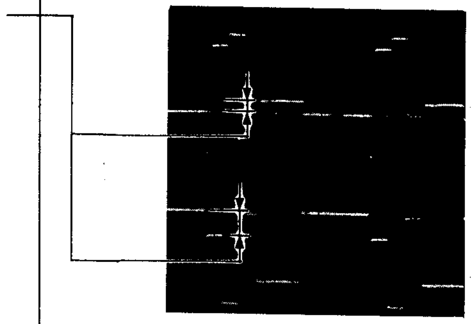
Press to turn on.

Press to turn on.

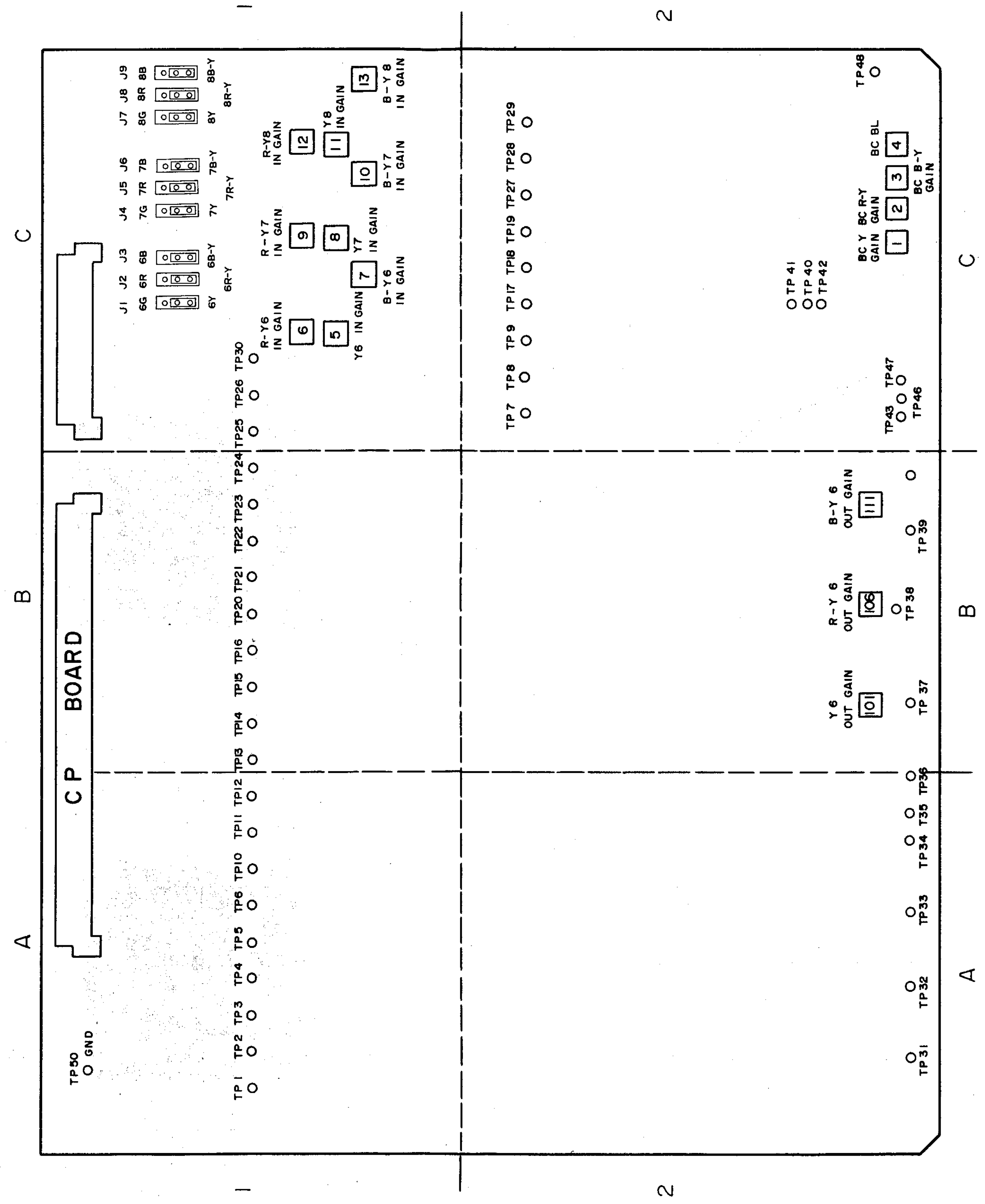
Press to turn on "DSK ON".

3.9.2 DSK matte color adjustment

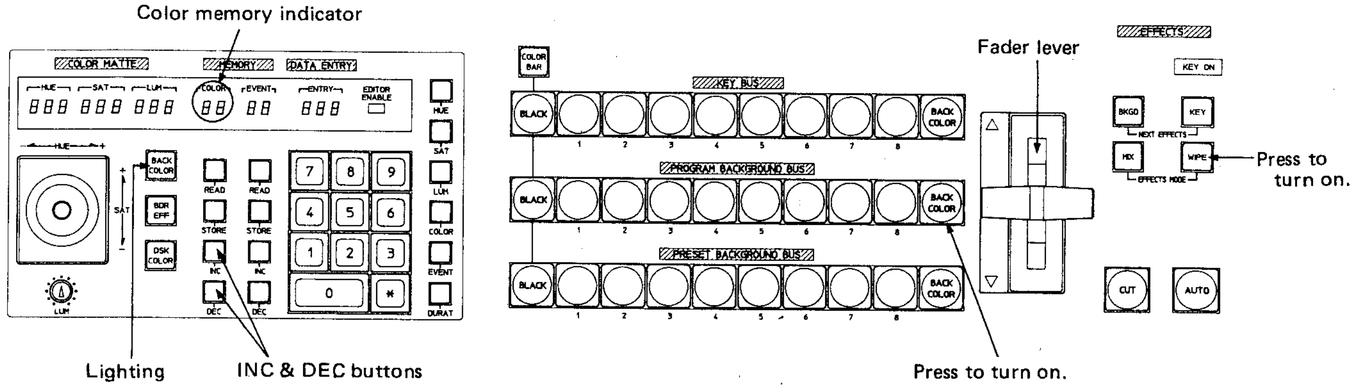
1	DSK matte color	Oscilloscope (H-rate, 10 : 1)	Color bars' white White of DSK color  Condition of PGM monitor ** NTSC : 07 PAL : 08 ◎ PGM 1 Y OUTPUT ⏀ DSK Y GAIN (R328) [KEY - 2A] ☆ Equal to color bars' white level	1) Connect an extention board to the KEY board. 2) Set the Fader lever to the lowest position and reset the unit according to the procedure of Section 3.3. 3) Set buttons and controls referring to the above figure. 4) Ovserving the PGM (program) monitor, turn the SLICE control to align white of color bars and keyed DSK color. If the control is turned much more, it causes alteration of color bar's level. Set it just before the alteration. 5) Press the INC or DEC button to select " ** " for color memory. (DSK color turns into white.) 6) Adjust DSK color level so as to be the same as color bars' white level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
		Oscilloscope (H-rate, 10 : 1)	◎ PGM 1 R-Y OUTPUT ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⏀ DSK BL (R331) [KEY - 2A] ☆ Set to center position.	7) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 8) Press the INV button to turn out. 9) Select "01" (blue) for the color memory. 10) Observing the PGM monitor turn the SLICE control to align color bars' blue and the DSK color. **Note:** If the control is turned too much, it causes alteration of blue level of color bars signal. Set it just before the alteration. 11) Set the DSK BL (R331) to the mechanical center.
			⏀ DSK R-Y GAIN (R329) [KEY - 2A] ☆ Equal to blanking level	12) Select "00" (black) for the color memory. 13) Adjust level of DSK color (black) so as to coincide with blanking level.
			⏀ DSK B-Y GAIN (R330) [KEY - 2A] ☆ Equal to blanking level	 R-Y B-Y
			⏀ DSK BL (R331) [KEY - 2A] ☆ Same or proximate to color bars' blue level	14) Select "01" (blue) for the color memory. 15) Adjust R331 so that levels of DSK color (blue) and color bars become the same or proximate to each other. 
				16) Repeat the steps 12) through 15) until both levels of DSK color (blue) and color bars' blue become the same.

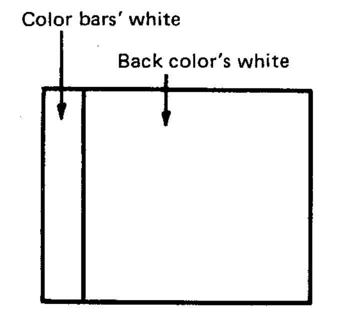
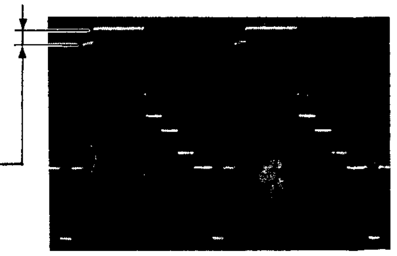
- **Adjustment parts location of CP board**

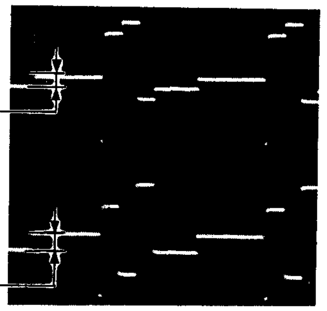
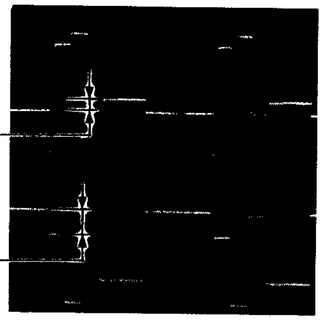

CP BOARD
A
B
C
1
2
J1 J2 J3
6G 6R 6B
6Y 6R-Y 6B-Y
J4 J5 J6
7G 7R 7B
7Y 7R-Y 7B-Y
J7 J8 J9
8G 8R 8B
8Y 8R-Y 8B-Y
R-Y6 IN GAIN
Y6 IN GAIN
B-Y6 IN GAIN
R-Y7 IN GAIN
Y7 IN GAIN
B-Y7 IN GAIN
R-Y8 IN GAIN
Y8 IN GAIN
B-Y8 IN GAIN
1
2
3
4
5
6
7
8
9
10
11
12
13
BC Y GAIN
BC R-Y GAIN
BC B-Y GAIN
BC BL
Y6 OUT GAIN
R-Y 6 OUT GAIN
B-Y 6 OUT GAIN
101
106
111
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
TP20
TP21
TP22
TP23
TP24
TP25
TP26
TP27
TP28
TP29
TP30
TP31
TP32
TP33
TP34
TP35
TP36
TP37
TP38
TP39
TP40
TP41
TP42
TP43
TP46
TP47
TP48
TP50
GND

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure

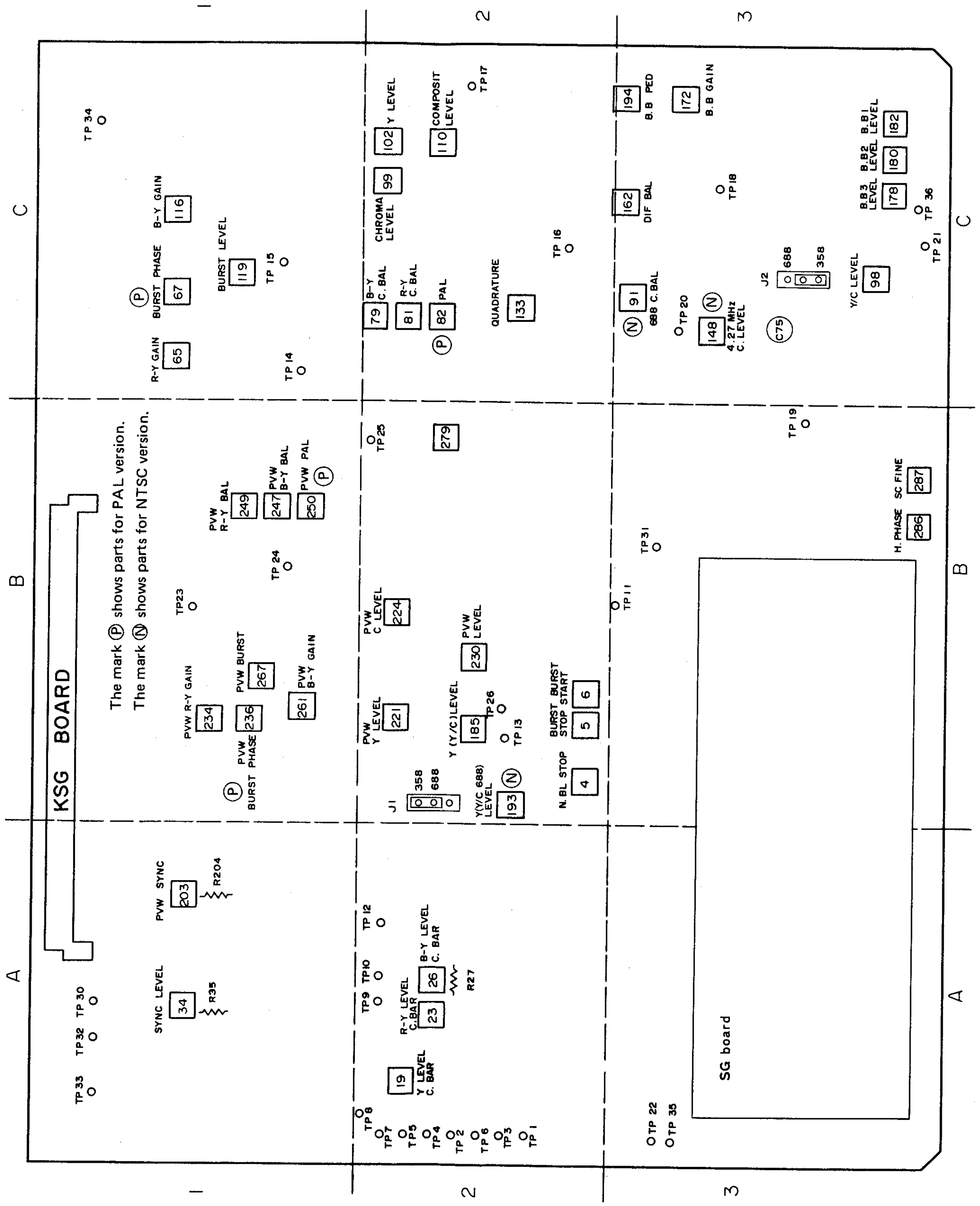

Color memory indicator
COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
7 8 9
4 5 6
1 2 3
0 *
DURAT
Lighting
INC & DEC buttons
COLOR BAR
KEY BUS
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
BLACK
BACK COLOR
1 2 3 4 5 6 7 8
Fader lever
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
CUT
AUTO
Press to turn on.
Press to turn on.

3.9.3 BACK COLOR adjustment

1	Back color	Oscilloscope (H-rate, 10 : 1)	 Color bars' white Back color's white Condition of program monitor ** NTSC : 07 PAL : 08 ◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⦶ BACK COLOR Y (R1) [CP - 2C] ☆ Equalize two white levels.	1) Connect an extention board to the CP board. 2) Move the EFFECT lever to the bottommost position, and reset the unit according to the procedure of Section 3.3. After this, confirm that the reset mode is taking place. 3) Set buttons and controls as shown in the above figure. 4) Press the INC or DEC button to select " ** " for color memory. 5) Observing the program monitor, move the Fader lever to align the back color's white and the color bars' white. 6) Equalize back color's white level and color bars' white level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
		Oscilloscope (H-rate, 10 : 1)	◎ PGM 1 R-Y OUTPUT ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator)	7) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 8) Select "01" (blue) for the color memory. 9) Observing the program monitor, move the Fader lever to align back color's blue and color bars' blue.
			⏀ BACK COLOR BL (R4) [CP - 2C]	10) Set the BACK COLOR BL (R4) to the center position. 11) Select "00" (black) for the color memory.
			⏀ BACK COLOR R-Y (R2) [CP - 2C] ☆ Equal to blanking level	12) Adjust black level of the back color so as to be the same as blanking level.
			⏀ BACK COLOR B-Y (R3) [CP - 2C] ☆ Equal to blanking level	
				13) Select "01" (black) for the color memory. 14) Adjust R4 so that blue level of the back color and color bar's blue level become the same or proximate to each other.
			⏀ BACK COLOR BL (R4) [CP - 2C] ☆ Same or proximate to color bars' blue level	
				15) Repeat the steps 11) through 14) until the two blue levels become equal to each other.

■ **Adjustment parts location of KSG board**


The mark Ⓟ shows parts for PAL version.
The mark Ⓝ shows parts for NTSC version.

KSG BOARD
1
2
3
A
B
C
TP 34
B-Y GAIN 116
BURST PHASE 67 Ⓟ
R-Y GAIN 65
BURST LEVEL 119
TP 15
TP 14
Y LEVEL 102
COMPOSIT LEVEL 110
TP 17
CHROMA LEVEL 99
B-Y C. BAL 79
R-Y C. BAL 81
PAL 82 Ⓟ
QUADRATURE 133
TP 16
B.B PED 194
B.B GAIN 172
DIF BAL 162
TP 18
B.B1 LEVEL 182
B.B2 LEVEL 180
B.B3 LEVEL 178
TP 36
TP 21
J2 688 358
Y/C LEVEL 98
688 C.BAL 91 Ⓝ
TP 20
4.27 MHz C. LEVEL 148 Ⓝ
C75 Ⓟ
TP 25
279
TP 19
PVW R-Y BAL 249
PVW B-Y BAL 247
PVW PAL 250 Ⓟ
SC FINE 287
H. PHASE 286
TP 31
TP 11
TP 24
TP23
PVW C LEVEL 224
PVW LEVEL 230
PVW R-Y GAIN 234
PVW BURST 267
PVW BURST PHASE 236 Ⓟ
PVW B-Y GAIN 261
PVW Y LEVEL 221
Y (Y/C) LEVEL 185
TP 26
TP 13
BURST START 6
BURST STOP 5
N. BL STOP 4
J1 358 688
Y(Y/C 688) LEVEL 193 Ⓝ
PVW SYNC 203
R204
SYNC LEVEL 34
R35
TP 12
TP10
TP 9
B-Y LEVEL C. BAR 26
R-Y LEVEL C.BAR 23
R27
Y LEVEL C. BAR 19
TP8
TP7
TP5
TP4
TP2
TP6
TP3
TP1
TP33
TP32
TP 30
TP 22
TP 35
SG board

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure

3.10 ADJUSTMENT OF INPUT 6 GAIN

This adjustment is required in the following cases:

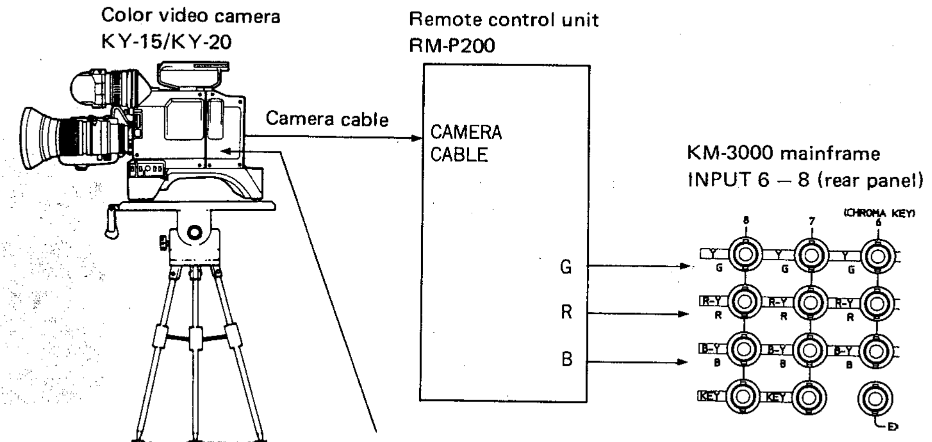
- When delay lines DL4, DL5, DL6 of the CP board and their peripheral parts were replaced.
- Output level of "INPUT 6" signal is conspicuously different from others' levels when the PROGRAM BKGD BUS is switched between "1" and "8" with the same input signal supplied.
- Before proceeding to do "Adjustment of INPUT 6 Transcoder" (Section 3.11).

1	Preparatory setup			1) Connect an extension board to the CP board for easy adjustment. 2) Set the Fader lever to the lowest position, and reset the unit according to the procedure of Section 3.3. 3) Confirm the color bars signal output.
2	Y level	Oscilloscope (H-rate, 10 : 1)	◎ TP7 [CP - 2C] ◎ J1's pin (on Y6 side) [CP - 1C] ⦶ Y6 OUT GAIN (R101) ☆ Same signal level	1) Shortcircuit between PROGRAM 1 Y OUTPUT and INPUT 6 Y connectors on the rear panel of the main unit. 2) If J1 is set to G6 side, reset it to Y6 side. 3) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 4) Adjust R101 to equalize signal levels of the two channels on the oscilloscope. 5) Reset J1 as it was is changed.
3	R-Y level		◎ TP17 [CP - 2C] ◎ J2's pin (on R-Y 6 side) [CP - 1C] ⦶ R-Y 6 OUT GAIN (R106) [CP - 2B] ☆ Same signal level	1) Shortcircuit between PROGRAM 1 R-Y OUTPUT and INPUT 6 R-Y connectors. 2) If J2 is set to R6 side, reset it to R-Y 6 side. 3) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 4) Adjust R106 to equalize signal levels of the two channels on the oscilloscope. 5) Reset J2 as it was if changed.
4	B-Y level		◎ TP27 [CP - 2C] ◎ J3's pin (on B-Y 6 side) [CP - 1C] ⦶ B-Y 6 OUT GAIN (R111) [CP - 2B] ☆ Same signal level	1) Shortcircuit between PROGRAM 1 B-Y OUTPUT and INPUT 6 B-Y connectors. 2) If J3 is set to B6 side, reset it to B-Y 6 side. 3) Connect the oscilloscope as follows: → Oscilloscope's CH-1 → Oscilloscope's CH-2 4) Adjust R111 to equalize signal levels of the two channels on the oscilloscope. 5) Reset J3 as it was if changed.

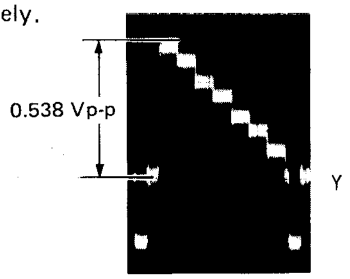
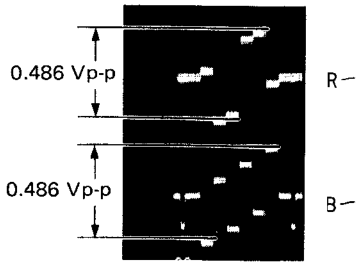
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

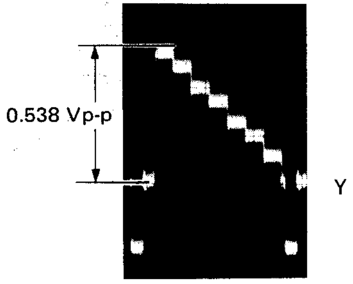
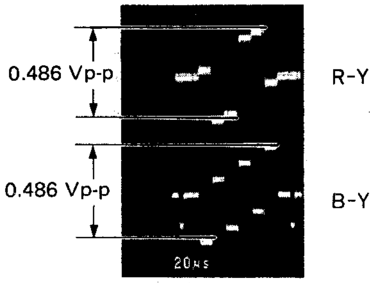
3.11 ADJUSTMENT OF TRANSCODER

- This adjustment is performed when there is a doubt about level of R-Y/Y/B-Y signal converted from R/G/B signal.
- Before proceeding to adjust the following items, connect a camera, remote control unit and KM-3000 as shown in the figure.



Set the CAMERA CABLE SELECT switch of KA-20 to "RM" position and DIP switch (S1) "AUTO" of VP board of the KA-20 to "ON".

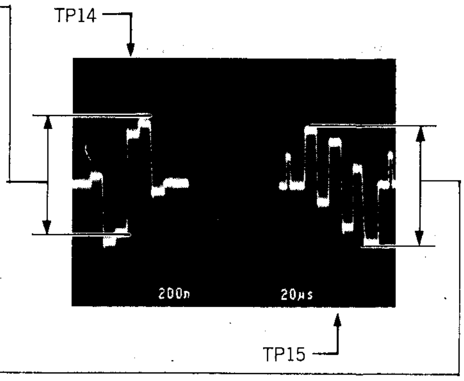
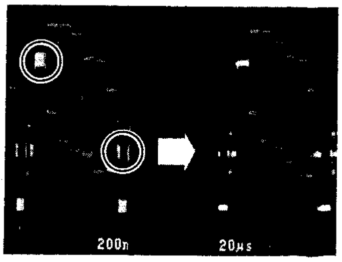
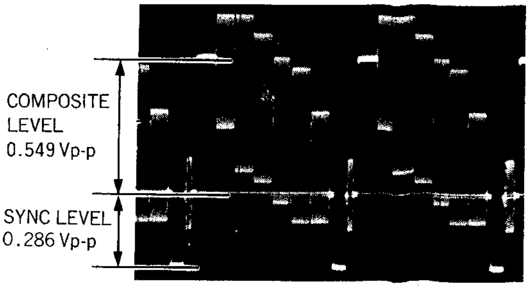
1	Preparatory setup	Oscilloscope (H-rate, 10 : 1) Grey scale chart	◎ Remote control unit Ⓣ R, G, B output terminals ☆ 0.525 Vp-p (with 75 Ω terminator)	1) Set the MODE switch of RM-P200 to "BARS" position. 2) Confirm each output level of R, G, B terminals of the remote control unit. 3) Connect an extension board to the CP board.
2	INPUT 6 transcoder	Oscilloscope (H-rate, 10 : 1)	When resetting the connectors, turn the power switch to "OFF". ◎ TP7 [CP - 2C] Ⓣ Y6 IN GAIN (R5) [CP - 1C] ☆ NTSC : 0.538 Vp-p PAL : 0.7 Vp-p ◎ TP17 [CP - 2C] Ⓣ R-Y 6 IN GAIN (R6) [CP - 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p ◎ TP27 [CP - 2C] Ⓣ B-Y 6 IN GAIN (R7) [CP - 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p	1) It is a first condition that "Adjustment of INPUT 6 Gain" (Section 3.10) has been completed. 2) Referring to the above figure, connect R, G, B terminals of the remote control unit to the INPUT 6 terminals on the rear panel of the mainframe. 3) If connectors J1 through J3 are set to Y, R-Y and B-Y sides, reset them to R, G, B sides. 4) Adjust VRs to obtain specified values respectively.   5) After completion of the above steps, reset the connectors as they were.

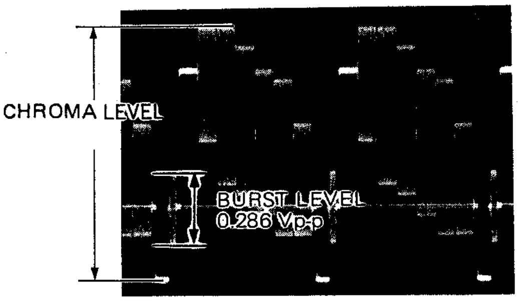
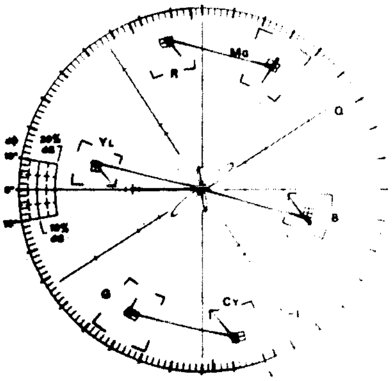
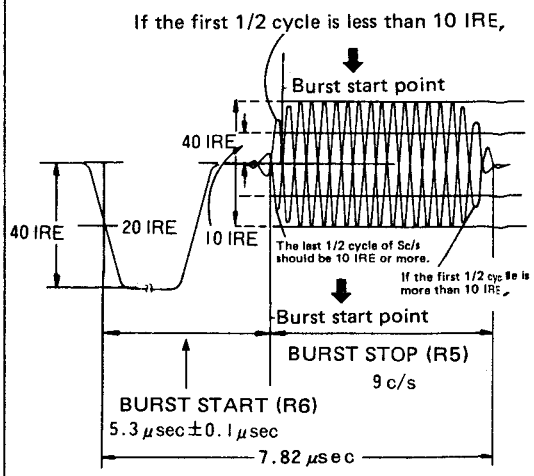
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	INPUT 7 transcoder	Oscilloscope (H-rate, 10 : 1)	◎ TP8 [CP - 2C] Ⓣ Y 7 IN GAIN (R8) [CP - 1C] ☆ NTSC : 0.538 Vp-p PAL : 0.7 Vp-p - ◎ TP18 [CP - 2C] Ⓣ R-Y 7 IN GAIN (R9) [CP - 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p - ◎ TP28 [CP - 2C] Ⓣ B-Y 7 IN GAIN (R10) [CP- 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p	1) Connect R/G/B output terminals of the remote control unit to the mainframe's INPUT 7 terminals (rear panel), respectively. 2) If connectors J4 through J6 are set to Y, R-Y and B-Y sides, reset them to R, G, B sides. 3) Adjust VRs to obtain specified values respectively.   4) After completion, reset the connectors as they were.
4	INPUT 8 transcoder		◎ TP9 [CP - 2C] Ⓣ Y 8 IN GAIN (R11) [CP - 1C] ☆ NTSC : 0.538 Vp-p PAL : 0.7 Vp-p - ◎ TP19 [CP - 2C] Ⓣ R-Y 8 IN GAIN (R12) [CP - 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p - ◎ TP29 [CP - 2C] Ⓣ B-Y 8 IN GAIN (R13) [CP - 1C] ☆ NTSC : 0.486 Vp-p PAL : 0.525 Vp-p	1) Connect R/G/B output terminals of the remote control unit to the mainframe's INPUT 8 terminals (rear panel), respectively. 2) If connectors J7 through J9 are set to Y, R-Y and B-Y sides, reset them to R, G, B sides. 3) In the same manner as the step for INPUT 7 transcoder, adjust VRs to obtain specified values respectively. 4) After completion, reset the connector as they were.

3.12 ADJUSTMENT OF ENCODER

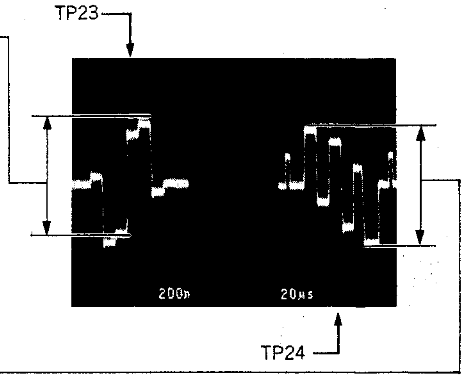
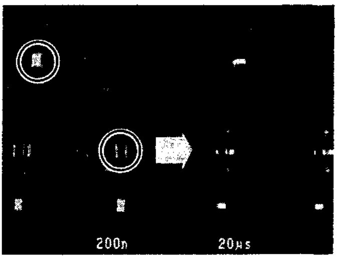
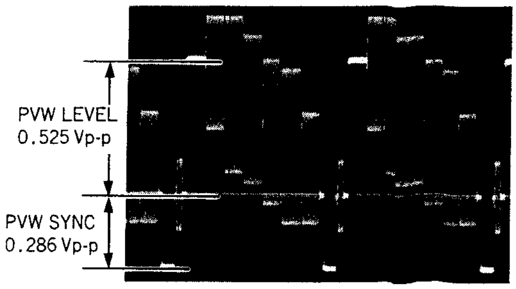
- Connect an extension board to the KSG board, and reset the whole unit according to the procedure described in Section 3.3. After the reset, confirm output of color bars signal.
- For the following procedure, refer to "Adjustment parts location of KSG board" on page 3-34.
- Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

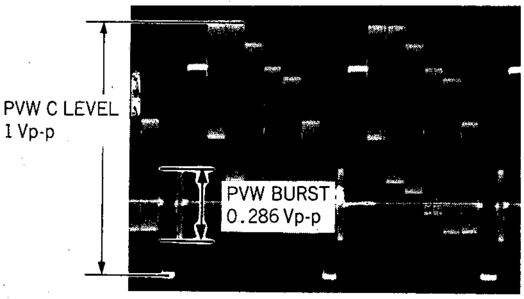
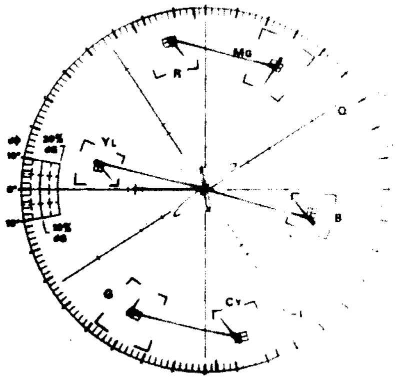
3.12.1-N Adjustment of PGM (program) composite signal output (NTSC version)

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
1	Color difference signal level	Oscilloscope (H-rate, 10 : 1)	⏀ CHROMA LEVEL (R99) [KSG - 2C] ☆ Mechanical center ◎ TP14 [KSG - 1C] ⏀ R-Y GAIN (R65) [KSG - 1C] ☆ 0.8 Vp-p ◎ TP15 [KSG - 1C] ⏀ B-Y GAIN (R116) [KSG - 1C] ☆ 0.6 Vp-p	• Set the CHROMA LEVEL (R99) to the mechanical center. 1) Adjust VRs to obtain specified values at the test points, respectively. 
2	Carrier balance		◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ B-Y C BAL (R79) [KSG - 2C] ⏀ R-Y C BAL (R81) [KSG - 2C] ☆ Minimum carrier leak	2) Turn the VRs alternately to minimize carrier leak in the white and black portions. 
3	Video signal level (1)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPLSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ COMPOSITE LEVEL (R110) [KSG - 2C] ☆ 0.549 Vp-p (77 IRE) ◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ SYNC LEVEL (R34) [KSG - 1A] ☆ 0.286 Vp-p (40 IRE)	3) Adjust video signal level in the order of COMPOSITE and then SYNC signal level.  NTSC

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
4	Video signal level (2)	Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ CHROMA LEVEL (R49) [KSG - 2C] ☆ 1 Vp-p (140 IRE) - - - - - - - - - - - - - - - - - ◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ BURST LEVEL (R119) [KSG - 1C] ☆ 0.286 Vp-p (40 IRE)	4) Adjust CHROMA signal and then BURST signal for the specified levels respectively.  CHROMA LEVEL BURST LEVEL 0.286 Vp-p
5	Quadrature	Vectorscope	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ QUADRATURE (R133) [KSG - 2C] • **If a vectorscope is not available, do not perform this adjustment.** If the spots are not at the correct points with QUADRATURE, perform adjustments CHROMA LEVEL (R99), B-Y GAIN (R116) and QUADRATURE (R133) again in this order.	5) Calibrate the gain of the vectorscope or set to 75% (preset position).  R MG YL Q B G CY 6) Check if all spots (R, G, B, MG, CY and YL) are at the correct points (within ⊞) on the vectorscope. If they are not, perform adjustment.
6	Burst point and width	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ BURST START (R6) [KSG - 2B] ⏀ BURST STOP (R5) [KSG - 2B]	7) Perform this adjustment as follows:  If the first 1/2 cycle is less than 10 IRE, Burst start point 40 IRE 40 IRE 20 IRE 10 IRE The last 1/2 cycle of Sc/s should be 10 IRE or more. If the first 1/2 cycle is more than 10 IRE, Burst start point BURST STOP (R5) 9 c/s BURST START (R6) 5.3 μsec±0.1 μsec 7.82 μsec

3.12.2-N Adjustment of PVW (preview) composite signal output (NTSC version)

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
1	Color difference signal level (PVW)	Oscilloscope (H-rate, 10 : 1)	◎ PVW C LEVEL (R224) [KSG - 2B] ☆ Mechanical center ◎ TP23 [KSG - 1B] ⦶ PVW R-Y GAIN (R234) [KSG - 1B] ☆ 0.8 Vp-p ◎ TP24 [KSG - 1B] ⦶ PVW B-Y GAIN (R261) [KSG - 1B] ☆ 0.6 Vp-p	• Set the PVW C LEVEL to its mechanical center. 1) Adjust VRs for the specified levels at the test points, respectively. 
2	Carrier balance (PVW)		◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW B-Y BAL (R249) [KSG - 1B] ⦶ PVW R-Y BAL (R247) [KSG - 1B] ☆ Minimum carrier leak	2) Alternately turn VRs to minimize carrier leak in the white and black portions. 
3	Video signal level (1) (PVW)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW LEVEL (R230) [KSG - 2B] ☆ 0.549 Vp-p (77 IRE) ◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW SYNC (R203) [KSG - 1A] ☆ 0.286 Vp-p (40 IRE)	3) Adjust VRs for PVW level first, and then for SYNC level. 

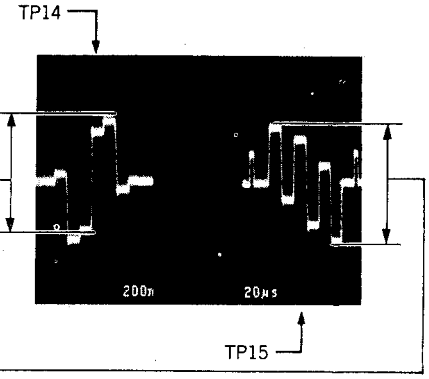
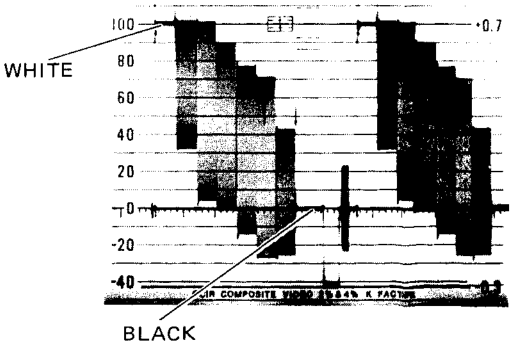
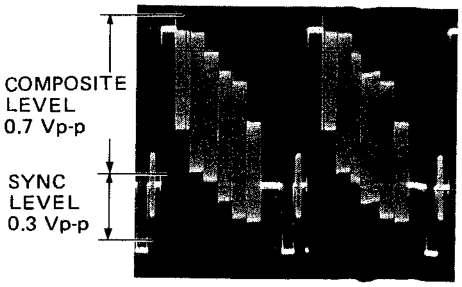
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
4	Video signal level (2) (PVW)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW C LEVEL (R224) [KSG - 2B] ☆ 1 Vp-p (140 IRE) - - - - - - - - - - - - - - - ◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW BURST (R267) [KSG - 1B] ☆ 0.286 Vp-p (40 IRE)	4) Adjust VRs for PVW C level first, and then for PVW BURST level. 
5	Quadrature (PVW)	Vec orscope	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW QUADRATURE (R279) [KSG - 2B] ● **If a vectorscope is not available, do not perform this adjustment.** If the spots are not at the correct points with PVW QUADRATURE, perform adjustments PVW C LEVEL (R224), PVW B-Y GAIN (R261) and PVW QUADRATURE (R279) again in this order.	5) Calibrate the gain of the vectorscope or set to 75% (preset position).  6) Check if all spots (R, G, B, MG, CY and YL) are at the correct points (within ⊞) on the vectorscope. If they are not, perform adjustment.

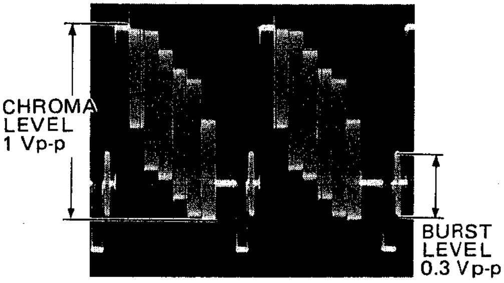
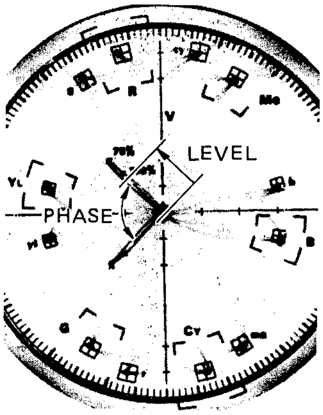
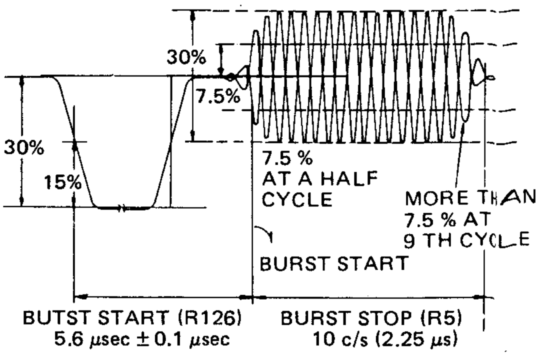
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

3.12 ADJUSTMENT OF ENCODER

- Connect an extension board to the KSG board, and reset the whole unit according to the procedure described in Section 3.3. After the reset, confirm output of color bars signal.
- For the following procedure, refer to "Adjustment parts location of KSG board" on page 3-34.
- Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

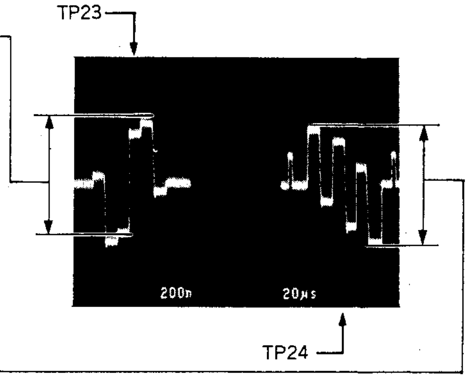
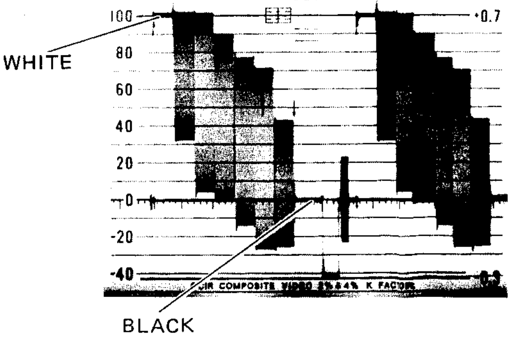
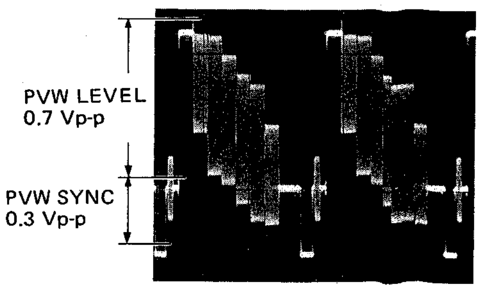
3.12.1-P Adjustment of PGM (program) composite signal output (PAL version)

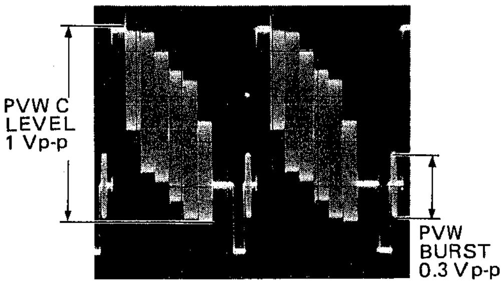
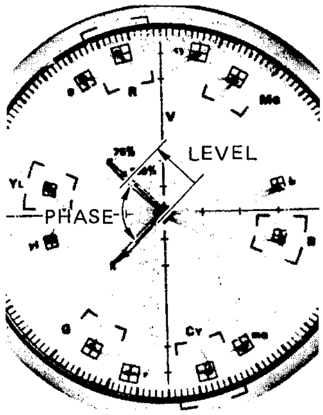
1	Color difference signal level	Oscilloscope (H-rate, 10 : 1)	Ⓣ CHROMA LEVEL (R99) [KSG - 2C] ☆ Mechanical center ◎ TP14 [KSG - 1C] Ⓣ R-Y GAIN (R65) [KSG - 1C] ☆ 0.8 Vp-p ◎ TP15 [KSG - 1C] Ⓣ B-Y GAIN (R116) [KSG - 1C] ☆ 0.6 Vp-p	• Set the CHROMA LEVEL (R99) to the mechanical center. 1) Adjust VRs to obtain specified values at the test points, respectively. 
2	Carrier balance		◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ B-Y C BAL (R79) [KSG - 2C] Ⓣ R-Y C BAL (R81) [KSG - 2C] ☆ Minimum carrier leak Ⓣ PAL (R82) [KSG - 2C] ☆ Minimum carrier leak at each line.	2) Turn the VRs alternately to minimize carrier leak in the white and black portions.  3) Adjust R82 to minimize carrier leakage of each line. R82 minimizes the carrier leakage of V-axis.
3	Video signal level (1)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPLSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ COMPOSITE LEVEL (R110) [KSG - 2C] ☆ 0.7 Vp-p ◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ SYNC LEVEL (R34) [KSG - 1A] ☆ 0.3 Vp-p	4) Adjust video signal level in the order of COMPOSITE and then SYNC signal level. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
4	Video signal level (2)	Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ CHROMA LEVEL (R49) [KSG - 2C] ☆ 1 Vp-p - - - - - - - - - - ◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ BURST LEVEL (R119) [KSG - 1C] ☆ 0.3 Vp-p	5) Adjust CHROMA signal and then BURST signal for the specified levels respectively.  CHROMA LEVEL 1 Vp-p BURST LEVEL 0.3 Vp-p
5	Quadrature	Vectorscope	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ QUADRATURE (R133) [KSG - 2C]	6) GAIN of vectorscope → CAL, or 75% (pre-set position) 7) Adjust VRs to set every spot (R, G, B, MG, CY, YL) at the specified point (with ⊞) on the vectorscope's screen as shown below.  LEVEL PHASE
		● **If a vectorscope is not available, do not perform this adjustment.** If the spots are not at the correct points with QUADRATURE, perform adjustments CHROMA LEVEL (R99), B-Y GAIN (R116) and QUADRATURE (R133) again in this order.		
			⏀ BURST PHASE (R67) [KSG - 1C] ⏀ BURST LEVEL (R119) [KSG - 1C]	8) Adjust R67 and R119 respectively for correct burst phase and burst level.
6	Burst point and width	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PGM COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⏀ BURST START (R6) [KSG - 2B] ⏀ BURST STOP (R5) [KSG - 2B]	9) Perform this adjustment as follows:  30% 7.5% 30% 15% 7.5 % AT A HALF CYCLE MORE THAN 7.5 % AT 9 TH CYCLE BURST START BUTST START (R126) 5.6 μsec ± 0.1 μsec BURST STOP (R5) 10 c/s (2.25 μs)

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure

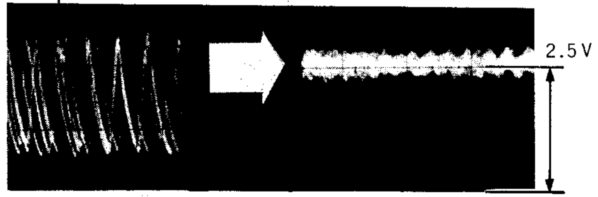
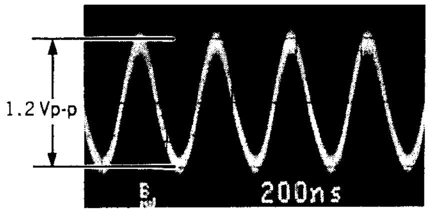
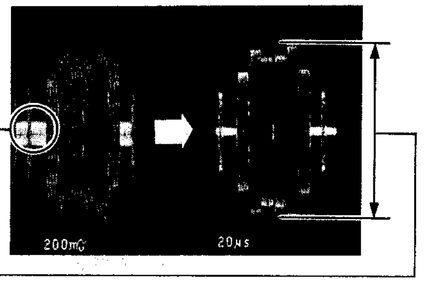
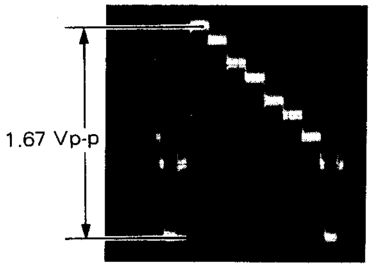
3.12.2-P Adjustment of PVW (preview) composite signal output (PAL version)

1	Color difference signal level (PVW)	Oscilloscope (H-rate, 10 : 1)	◎ PVW C LEVEL (R224) [KSG - 2B] ☆ Mechanical center ◎ TP23 [KSG - 1B] ⦶ PVW R-Y GAIN (R234) [KSG - 1B] ☆ 0.8 Vp-p	• Set the PVW C LEVEL to its mechanical center. 1) Adjust VRs for the specified levels at the test points, respectively. 
			◎ TP24 [KSG - 1B] ⦶ PVW B-Y GAIN (R261) [KSG - 1B] ☆ 0.6 Vp-p	
2	Carrier balance (PVW)		◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW B-Y BAL (R249) [KSG - 1B] ⦶ PVW R-Y BAL (R247) [KSG - 1B] ☆ Minimum carrier leak	2) Alternately turn VRs to minimize carrier leak in the white and black portions. 
			⦶ PVW PAL (R250) [KSG - 1B] ☆ Minimum carrier level at each line.	3) Adjust R165 to minimize carrier leakage of each line. R165 minimizes the carrier leakage of V-axis.
3	Video signal level (1) (PVW)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW LEVEL (R230) [KSG - 2B] ☆ 0.7 Vp-p	4) Adjust VRs for PVW level first, and then for SYNC level. 
			◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) ⦶ PVW SYNC (R203) [KSG - 1A] ☆ 0.3 Vp-p	

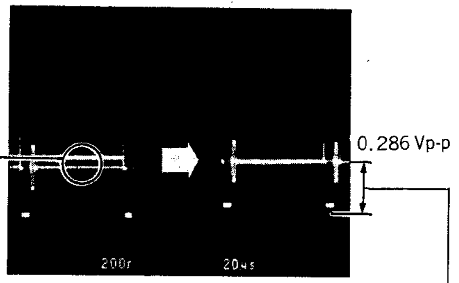
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
4	Video signal level (2) (PVW)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ PVW C LEVEL (R224) [KSG - 2B] ☆ 1 Vp-p	5) Adjust VRs for PVW C level first, and then for PVW BURST level. 
			◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ PVW BURST (R267) [KSG - 1B] ☆ 0.3 Vp-p	
5	Quadrature (PVW)	Vectorscope	◎ PVW COMPOSITE OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ PVW QUADRATURE (R279) [KSG - 2B]	6) Calibrate the gain of the vectorscope or set to 75% (preset position). 7) Adjust VRs to set every spot (R, G, B, MG, CY, YL) at the specified point (within ⊞) on the vectorscope's screen as shown below. 
		● **If a vectorscope is not available, do not perform this adjustment.** If the spots are not at the correct points with PVW QUADRATURE (R279), perform adjustments PVW C LEVEL (R224), PVW B-Y GAIN (R261) and PVW QUADRATURE (R279) again in this order.		
			Ⓣ PVW BURST PHASE (R236) [KSG - 1B] Ⓣ PVW BURST (R267) [KSG - 1B]	8) Adjust R236 and R267 respectively for correct burst phase and burst level.

3.12.3 Adjustment of Y/C signal output (NTSC and PAL versions)

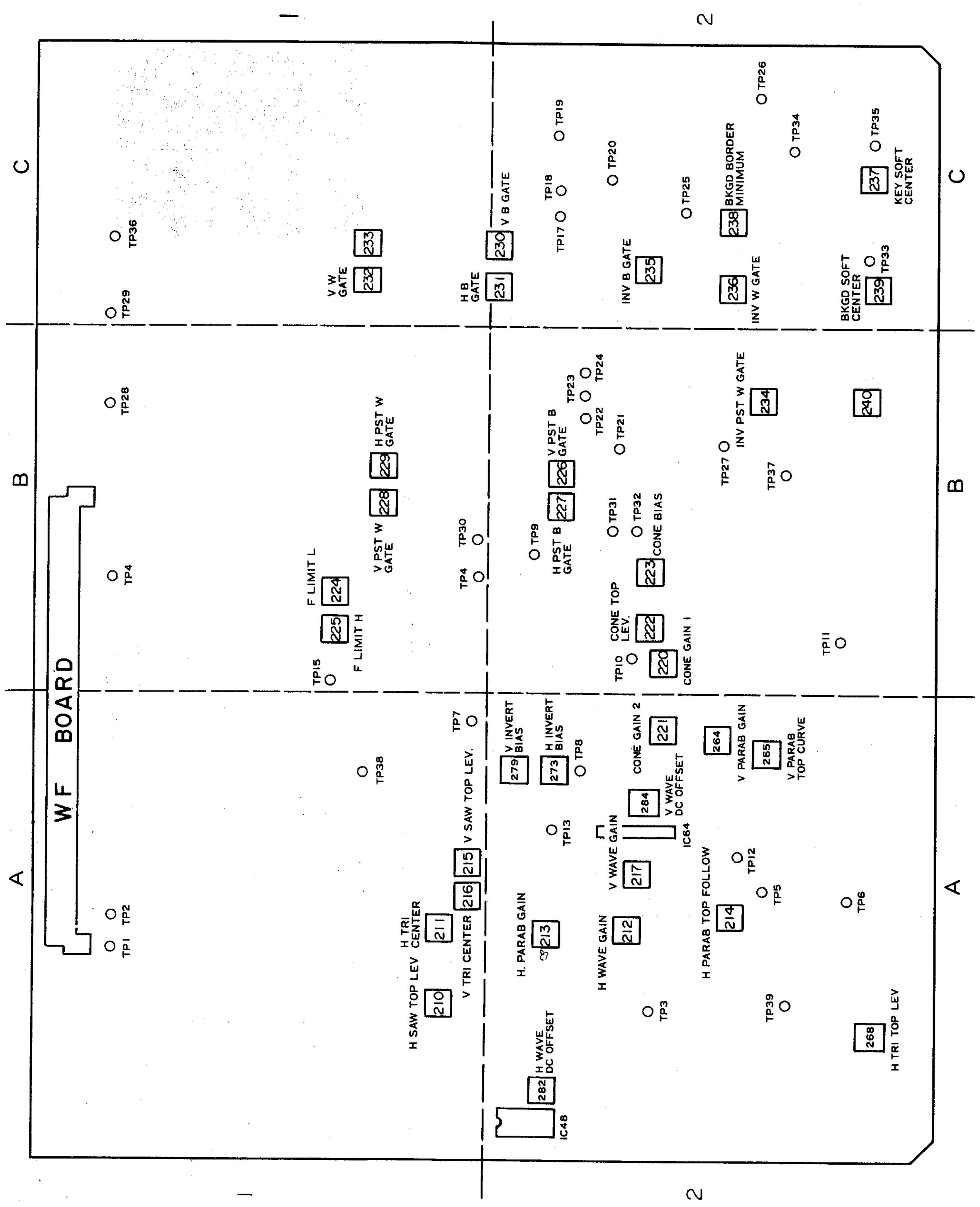
- To proceed to adjust the following items, it is the first condition that "Adjustment of PGM composite signal output" (Section 3.12.1) has been completed.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
1	4.27 MHz LOCK signal (NTSC version only)	Oscilloscope (10 : 1, 200 nsec)	◎ TP19 [KSG - 3B] Ⓣ 4.27 LOCK (C75) [KSG - 3C] ☆ Minimum ripple at 2.5 V DC	1) Adjust for the minimum ripple at 2.5 V DC. 
2	4.27 MHz Locking level (NTSC version only)		◎ TP20 [KSG - 3C] Ⓣ 4.27 C. LEVEL (R148) [KSG - 3C] ☆ 1.2 Vp-p	2) Adjust R148 to obtain the specified level. 
3	Carrier balance (NTSC version only)	Waveform monitor or Oscilloscope Video signal generator (composite color bars)	Ⓣ J2 [KSG - 3C] ◎ TP21 [KSG - 3C] Ⓣ 688 C. BAL (R91) [KSG - 3C] ☆ Minimum carrier leak	• If J2 is set to "358" side, reset it to "688" side. 3) Minimize carrier leak at the center section. 
4	Output level		◎ TP21 [KSG - 3C] Ⓣ Y/C C. LEVEL (R98) [KSG - 3C] ☆ 1.7 Vp-p	4) Adjust R98 to obtain the specified output level. • Reset J2 as it was. (NTSC version)
			◎ TP13 [KSG - 2B] Ⓣ Y (Y/C) LEVEL (R185) [KSG - 2B] ☆ 1.67 Vp-p	• If J1 is set to "688" side, reset it to "358" side. (NTSC version) 5) Adjust R185 to obtain the specified output level. 
5	"688" Y level (NTSC version only)		◎ TP13 [KSG - 2B] Ⓣ Y (Y/C 688) LEVEL R193 [KSG - 2B] ☆ 1.67 Vp-p Ⓣ J1 [KSG - 2B]	6) Set J1 to "688" side. 7) Adjust R193 to obtain the specified output level.

3.12.4 Adjustment of reference B.B. (black burst) output (NTSC and PAL versions)

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
1	Pedestal level	Waveform monitor or Oscilloscope (10 : 1)	◎ TP18 [KSG - 3C] Ⓣ B.B. GAIN (R172) [KSG - 3C] ☆ Make pedestal flat.	1) Adjust R172 to minimize difference between pedestal levels. 
			Ⓣ DIF BAL (R162) [KSG - 3C] ☆ Minimize the serration.	2) Minimize serration of pedestal waveform.
2	Output level		◎ B.B. 1 OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ B.B. 1 LEVEL (R182) [KSG - 3C] ☆ Sync. level: NTSC : 0.3 Vp-p PAL : 0.286 Vp-p ◎ B.B. 2 OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ B.B. 2 LEVEL (R180) [KSG - 3C] ☆ Sync. level: NTSC : 0.3 Vp-p PAL : 0.286 Vp-p ◎ B.B. 3 OUTPUT [Rear panel] (with 75-ohm terminator) Ⓣ B.B. 3 LEVEL (R178) [KSG - 3C] ☆ Sync. level: NTSC : 0.3 Vp-p PAL : 0.286 Vp-p	3) Adjust VRs for each output to be of the specified levels respectively.

■ **Adjustment parts location of WF board**



1
2
C
B
A
WF BOARD
TP36
TP29
V W GATE
233
232
H B GATE
230
231
V B GATE
TP17
TP18
TP19
TP20
INV B GATE
235
TP25
238
BKGD BORDER MINIMUM
236
INV W GATE
TP26
TP34
TP35
237
KEY SOFT CENTER
BKGD SOFT CENTER
239
TP33
TP28
H PST W GATE
229
228
V PST W GATE
TP23
TP24
TP22
TP21
V PST B GATE
226
227
H PST B GATE
TP9
TP30
TP4
INV PST W GATE
234
TP27
TP37
240
TP31
TP32
CONE BIAS
223
CONE TOP LEV.
222
TP10
220
CONE GAIN 1
TP11
F LIMIT L
224
225
F LIMIT H
TP15
TP7
V INVERT BIAS
279
H INVERT BIAS
273
TP8
CONE GAIN 2
221
V PARAB GAIN
264
265
V PARAB TOP CURVE
TP38
V SAW TOP LEV.
215
216
TP13
284
V WAVE DC OFFSET
IC64
V WAVE GAIN
217
TP12
H PARAB TOP FOLLOW
214
TP5
TP6
H TRI CENTER
211
V TRI CENTER
H PARAB GAIN
213
H WAVE GAIN
212
TP1
TP2
H SAW TOP LEV
210
TP3
TP39
268
H TRI TOP LEV
282
H WAVE DC OFFSET
IC48

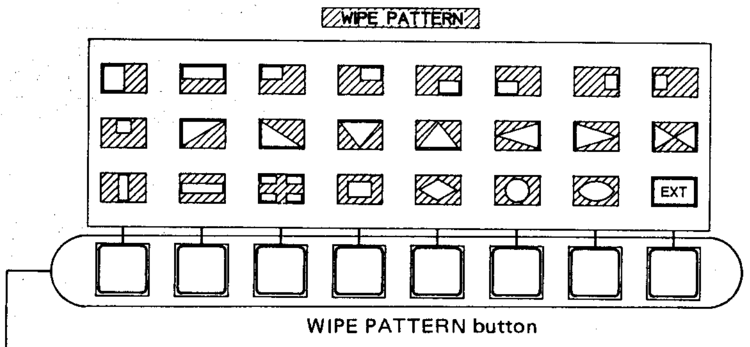
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure

3.13 ADJUSTMENT OF WIPE PATTERN WAVEFORM

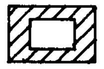
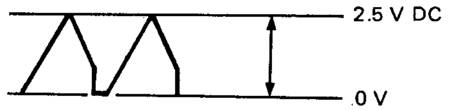
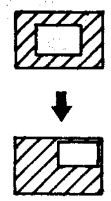
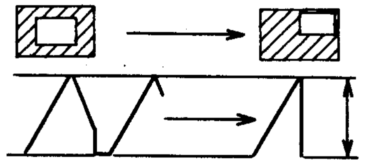
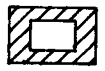
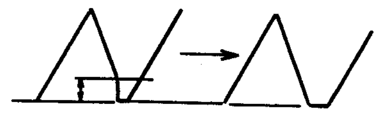
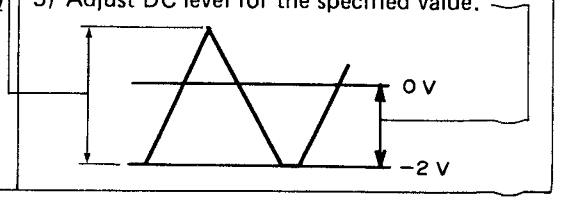
- For the following procedure, refer to "Adjustment parts location of WF board" on page 3-42.
- Symbol (word) and code in square brackets indicate the board name and the block where the adjustment part is located in.

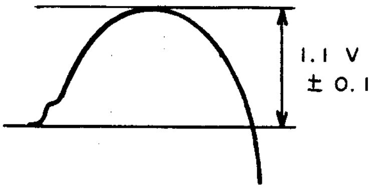
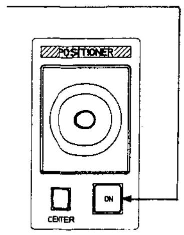
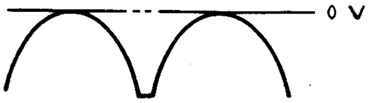
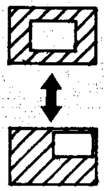
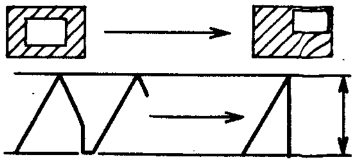
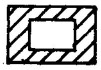
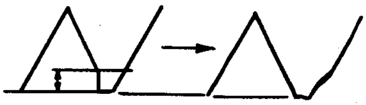
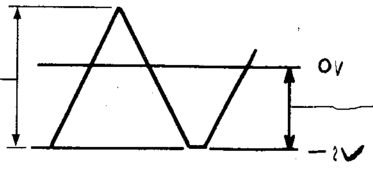
3.13.1 Adjustment of wipe pattern generator

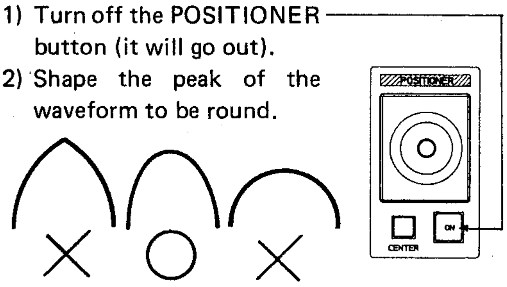
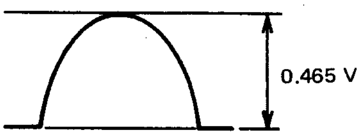
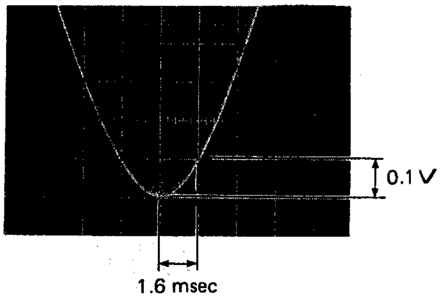
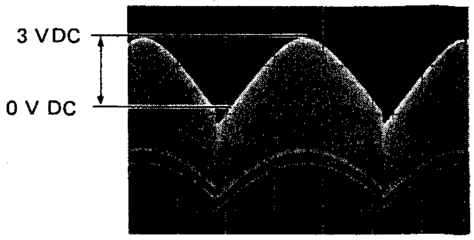
- Underlined adjustment parts are subject to precise adjustment of Section 3.13.3.
- According to the wipe pattern specified in the column of "Measuring instruments & Input signals", select the wipe pattern by pressing a WIPE PATTERN button corresponding to it.



WIPE PATTERN
EXT
WIPE PATTERN button

1	Preparatory setup			1) Connect an extention board to the WF board. 2) Set the FADER lever to the bottommost position, and reset the unit according to the procedure described in Section 3.3.
2	H. triangular and sawtooth waveforms	Oscilloscope (H-rate, 10 : 1) (DC input)	◎ TP3 [WF - 2A] ⦶ H TRI TOP LEV (R268) [WF - 2A] ☆ 2.5 V DC	1) Adjust DC level for the specified value. 
			◎ TP3 [WF - 2A] ⦶ H SAW TOP LEV (R210) [WF - 1A] ☆ Even peak level	2) Shape waveforms with R210 so that peak level does not fluctuate at switchover of waveforms. 
			◎ TP3 [WF - 2A] ⦶ H TRI CENTER (R211) [WF - 1A]	3) Shape the waveform. 
			◎ TP4 [WF - 1B] ⦶ H WAVE DC OFFSET (R282) [WF - 2A] ◎ TP4 [WF - 1B] ⦶ H WAVE GAIN (R212) [WF - 2A]	4) Adjust peak level to 2.5 V. 5) Adjust DC level for the specified value. 

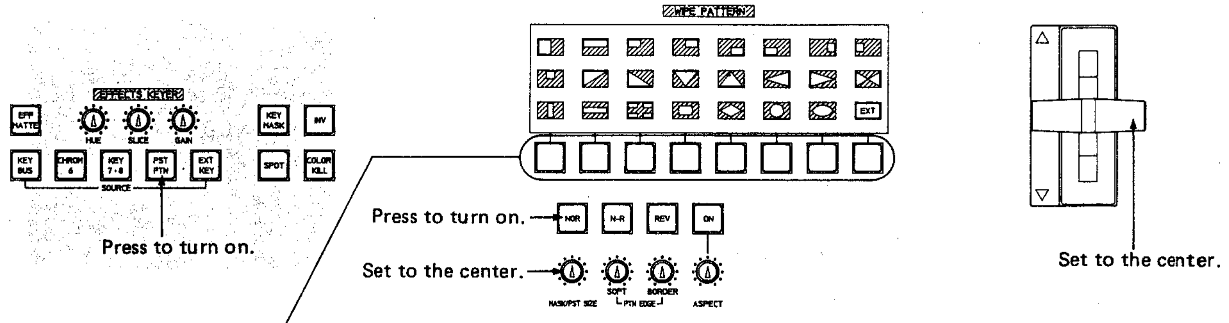
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure
3	H. parabolic waveform	Oscilloscope (H-rate, 10 : 1) 	◎ TP5 [WF - 2A] ⌽ H PARA B GAIN (R213) [WF] 2A] ☆ 1.1 Vp-p	1) Adjust peak level of the parabolic waveform to be of the specified value. 
			◎ TP6 [WF - 2A] ⌽ H PARAB TOP FOLLOW (R214) [WF - 2A]	2) Turn on the POSITIONER button (it will come on). 3) Adjust R214 to keep the peak level at 0 V with the POSITIONER moved to right or left.  
4	V. triangular and sawtooth waveforms	Oscilloscope (V-rate, 10 : 1) (DC input) 	◎ TP13 [WF - 2A] ⌽ V SAW TOP LEV (R215) [WF - 1A] ☆ Even peak level	1) Shape waveforms with R215 so that peak level does not fluctuate at switchover of waveforms. 
			◎ TP13 [WF - 2A] ⌽ V TRI CENTER (R216) [WF - 1A]	2) Shape the waveform. 
			◎ TP12 [WF - 2A] ⌽ V WAVE DC OFFSET (R284) [WF - 2A] ◎ TP12 [WF - 2A] ⌽ V WAVE GAIN (R217) [WF - 2A]	3) Adjust peak level to 2.5 V. 4) Adjust DC level to be of the specified value. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
5	V. parabolic waveform	Oscilloscope (V-rate, 10 : 1) 	◎ TP11 [WF - 2B] Ⓣ V PARAB TOP CURVE (R265) [WF - 2A] ☆ Round shape at peak	1) Turn off the POSITIONER button (it will go out). 2) Shape the peak of the waveform to be round. 
			◎ TP11 [WF - 2B] Ⓣ V PARAB GAIN (R264) [WF - 2A] ☆ 0.465 V	3) Adjust the peak level for the specified value. 
		Oscilloscope (0.1 V/div., 1 msec/div.)	Ⓣ CONE GAIN 2 (R221) [WF - 2A] Ⓣ CONE GAIN 1 (R220) [WF - 2B] Fully counter-clockwise position ◎ TP10 [WF - 2B] Ⓣ CONE TOP LEV (R222) [WF - 2B]	4) Turn R221 and R222 fully counterclockwise. 5) Shape the waveform so that level difference in the range of ±1.6 msec before and after the trailing edge peak becomes 0.1 V. 
		Oscilloscope (DC input; 1 V/div., 5 msec/div.)	◎ TP9 [WF - 2B] Ⓣ CONE BIAS (R223) [WF - 2B]	6) Adjust peak level for the specified value. 
6	REV mode bias	Digital voltmeter	◎ TP7 [WF - 1A] Ⓣ H INVERT BIAS (R273) [WF - 2A] ☆ 0.3 V DC	1) Adjust H and V bias levels for the specified values.
			◎ TP8 [WF - 2A] Ⓣ V INVERT BIAS (R279) [WF - 2A] ☆ 0.3 Vp-p	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

3.13.2 Adjustment of gate signal

- Underlined adjustment parts are subject to precise adjustment of Section 3.13.3.

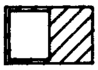
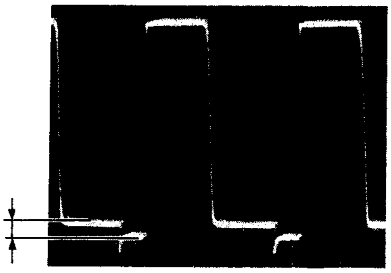
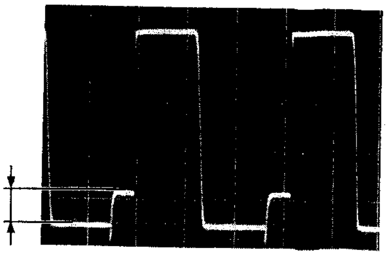
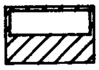

EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SOURCE
SPOT
COLOR KILL
WIPE PATTERN
EXT
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT

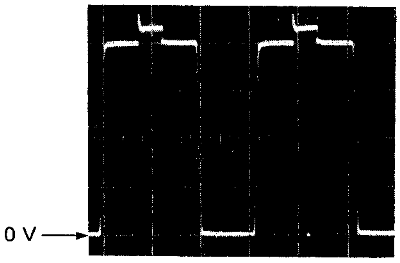
Press to turn on.

Press to turn on.

Set to the center.

Set to the center.

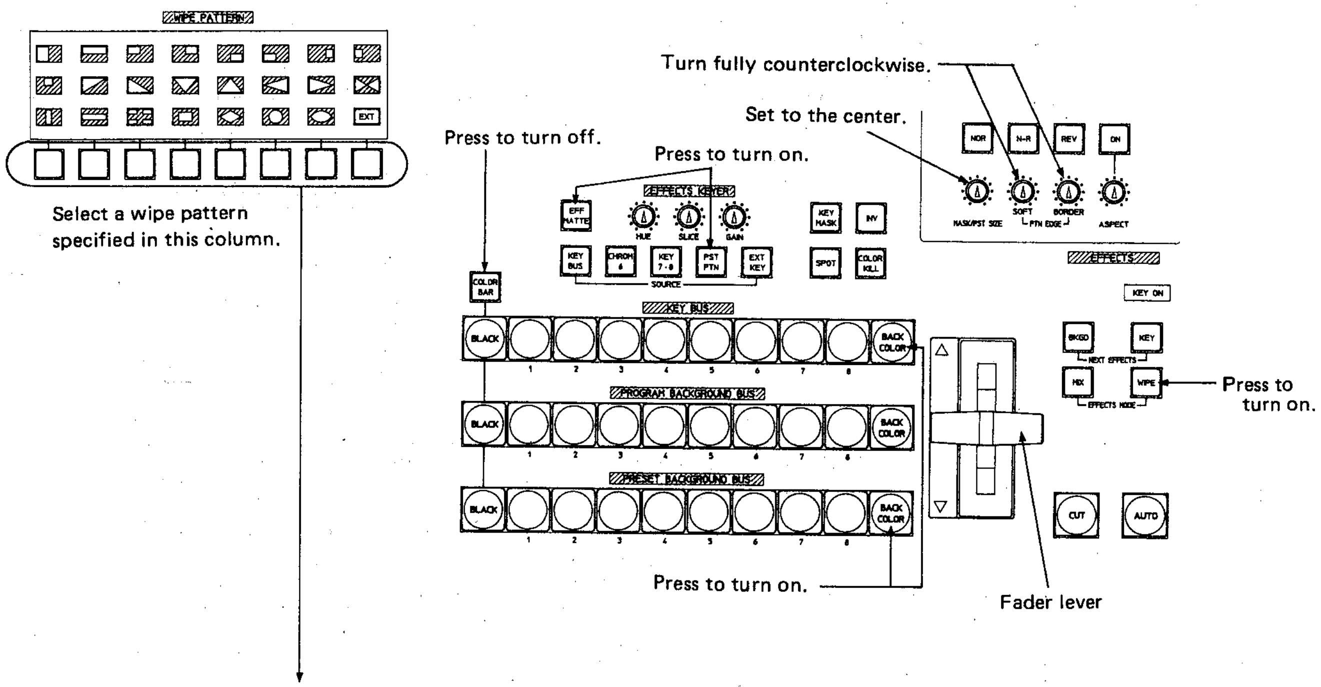
1	Preparatory setup			• Set buttons and controls as shown in the figure above.
2	H. wipe gate signal	Oscilloscope (H-rate, 10 : 1) 	◎ TP17 [WF - 2C] Ⓣ H W GATE (R223) [WF - 1C] ☆ Equalize DC level. ◎ TP22 [WF - 2B] Ⓣ H PST W GATE (R229) [WF - 1B] ☆ Equalize DC level.	1) Adjust VRs to equalize DC levels to the blanking level, respectively.  or 
3	H. border gate signal		◎ TP18 [WF - 2C] Ⓣ H B GATE (R231) [WF - 2C] ☆ Equalize DC level. ◎ TP24 [WF - 2B] Ⓣ H PST B GATE (R227) [WF - 2B] ☆ Equalize DC level.	
4	V. wipe gate signal	Oscilloscope (V-rate, 10 : 1) 	◎ TP20 [WF - 2C] Ⓣ V W GATE (R232) [WF - 1C] ☆ Equalize DC level. ◎ TP21 [WF - 2B] Ⓣ V PST W GATE (R228) [WF - 1B] ☆ Equalize DC level.	
5	V. border gate signal		◎ TP19 [WF - 2C] Ⓣ V B GATE (R230) [WF - 2C] ☆ Equalize DC level. ◎ TP27 [WF - 2B] Ⓣ V PST B GATE (R226) [WF - 2B] ☆ Equalize DC level.	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
6	Inversion gate signal	Oscilloscope (V-rate, 10 : 1) (DC input) ▨	◎ TP25 [WF - 2C] Ⓣ INV W GATE (R236) [WF - 2C] ☆ Blanking level: 0 V	2) Adjust respective blanking level to 0 V. 
			◎ TP26 [WF - 2C] Ⓣ INV B GATE (R235) [WF - 2C] ☆ Blanking level: 0 V	
			◎ TP27 [WF - 00] Ⓣ INV PST W GATE (R234) [WF - 2B] ☆ DC level : 0 V	
7	Gate signal level	Digital voltmeter	◎ TP33 [WF - 2C] Ⓣ BKGD SOFT CENTER (R239) [WF - 2C] ☆ 3.1 V DC	3) Adjust DC level to the specified value respectively.
			◎ TP34 [WF - 2C] Ⓣ BKGD BORDER MINIMUM (R238) [WF - 2C] ☆ 1.9 V DC	
			◎ TP35 [WF - 2C] Ⓣ KEY SOFT CENTER (R237) [WF - 2C] ☆ 3 V DC	
			◎ Q10-B [KEY - 1C] Ⓣ SOFT CENTER (R310) [KEY - 1C] ☆ 2.4 V DC	4) Connect an extension board to the KEY board. 5) Set buttons and controls again according to the item No. 1 of this section. 6) Adjust R310 and R311 to obtain the specified DC levels respectively.
			◎ Q14-B [KEY - 1C] Ⓣ BORDER MINIMUM (R311) [KEY - 1C] ☆ 2.4 V DC	

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

3.13.3 Effects adjustment

- For this adjustment, it is the first condition that all items of Section 3.13.1 and 3.13.2 have been correctly adjusted.
- Proceed to adjust every item observing a program monitor (under-scan type color video monitor).
- According to the wipe pattern specified in the column of "Measuring instruments & Input signals", select the wipe pattern by pressing a WIPE PATTERN button corresponding to it.


WIPE PATTERN
EXT
EFFECTS KEYER
EFF MATTE
HUE
SLICE
GAIN
KEY BUS
CHROM 6
KEY 7-8
PST PTN
EXT KEY
SOURCE
KEY MASK
INV
SPOT
COLOR KILL
COLOR BAR
KEY BUS
BLACK
BACK COLOR
1
2
3
4
5
6
7
8
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
NOR
N-R
REV
ON
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
CUT
AUTO

Select a wipe pattern specified in this column.

Press to turn off.

Press to turn on.

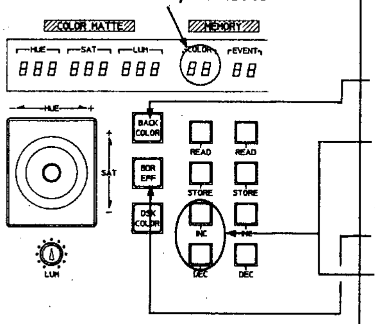
Set to the center.

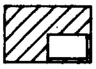
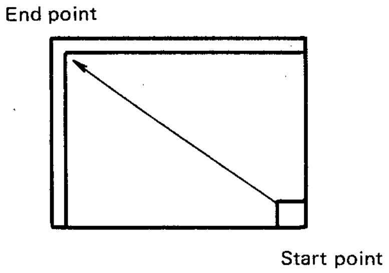
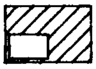
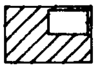
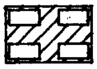
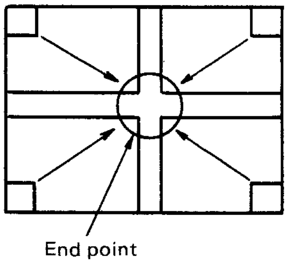
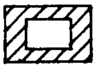
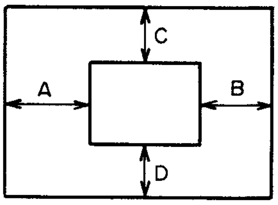
Turn fully counterclockwise.

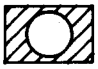
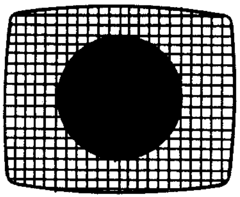
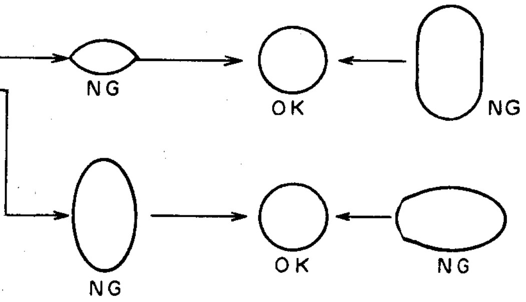
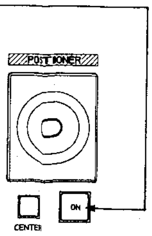
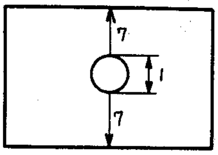
Press to turn on.

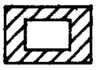
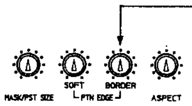
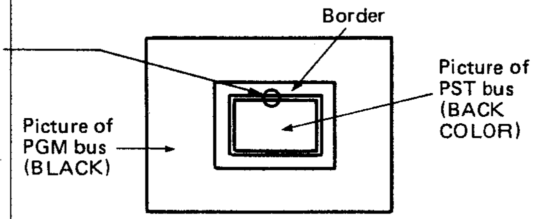
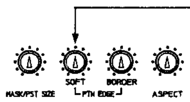
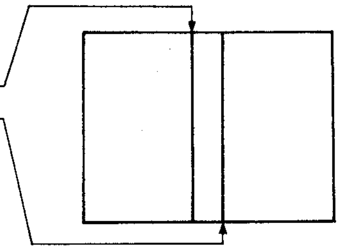
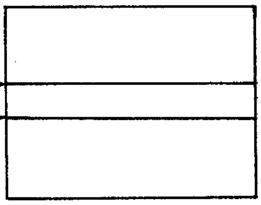
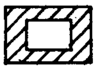
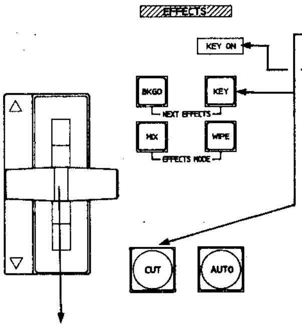
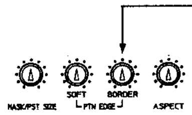
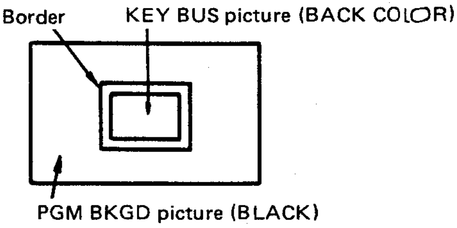
Press to turn on.

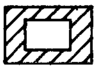
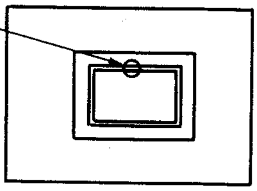
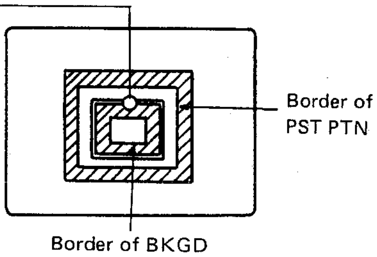
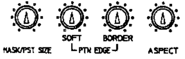
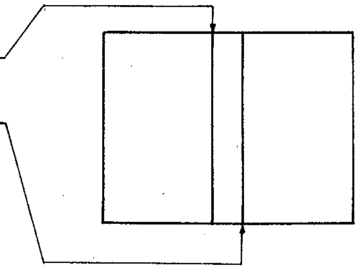
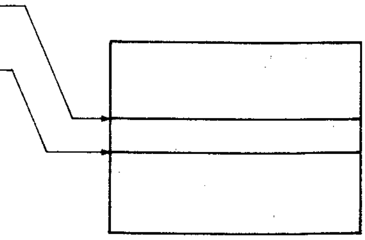
Fader lever

1	Preparatory setup		Color memory indicator  COLOR MATTE MEMORY HUE SAT LUM COLOR EVENT BACK COLOR BDR EFF DSK COLOR READ STORE INC DEC LUM	1) Connect an extension board to the WF board. 2) Set the Fader lever to the bottommost position, and reset the unit according to the procedure of Section 3.3. After this, confirm that the reset mode takes place. 3) Set buttons and controls as shown in the above figure. 4) Press the BACK COLOR button of COLOR MATTE section. 5) Press the color memory's INC or DEC button several times to select "06" (yellow) for the color memory. 6) Press the BDR EFF button. 7) Press the color memory's INC button several times to select "07" (75% white) for the color memory.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure
2	Corner wipe (1)		◎ PROGRAM MONITOR ⌽ H SAW TOP LEV (R210) [WF - 1A] ☆ Same start point for H & V wipe ◎ PROGRAM MONITOR ⌽ H WAVE GAIN (R212) [WF - 2A] ☆ Same end point for H & V wipe	1) Observing the monitor, move the Fader lever slowly to take note of point where wipe starts. 2) Adjust R210 so that wipe starts and extends in the horizontal and vertical directions simultaneously. 3) Move the Fader lever slowly to take note of end point of wipe. 4) Adjust R212 so that wipe ends in the horizontal and vertical directions simultaneously. 
3	Corner wipe (2)	 	◎ PROGRAM MONITOR ⌽ H INVERT BIAS (R279) [WF - 2A] ☆ Same end point for H & V wipe ◎ PROGRAM MONITOR ⌽ V INVERT BIAS (R273) [WF - 2A] ☆ Same end point for H & V wipe	1) Move the Fader lever slowly to take note of end point of wipe. 2) Adjust VRs so that wipe ends in the horizontal and vertical directions simultaneously.
4	Cross wipe		◎ PROGRAM MONITOR ⌽ H TRI TOP LEV (R268) [WF - 2A] ☆ Same end point for H & V wipe	1) Move the Fader lever slowly to take note of end point of wipe. 2) Adjust wipe end so that it take place in the horizontal and vertical directions simultaneously. 
5	Window wipe		◎ PROGRAM MONITOR ⌽ H TRI CENTER (R211) [WF - 1A] ☆ A = B ◎ PROGRAM MONITOR ⌽ V TRI CENTER (R216) [WF - 1A] ☆ C = D	1) Set the Fader lever to the center position. 2) Adjust R211 to equalize "A" and "B" shown in the figure.  3) Adjust R211 to equalize "C" and "D".

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
6	Round wipe			• It is recommended to use a cross hatch signal generator for more precise adjustment. In case of use, supply cross hatch signal to the INPUT 1 Y terminal and select the INPUT 1 by the PROGRAM BACKGROUND BUS button. (Program monitor displays such a pattern as shown below.) 
			◎ PROGRAM MONITOR ⏀ V PARAB TOP CURVE (R265) [WF - 2A] ⏀ H PARAB GAIN (R264) [WF - 2A] ☆ To shape regular circle	• If a cross hatch signal generator is not available, adjust it by observing the monitor by eyes. 1) Set the Fader lever to the center position. 2) Adjust VRs so that wipe pattern shapes regular circle on the whole. 
				3) Set the POSITIONER to "ON". (Button lights.) 4) Move the Fader lever to make the wipe pattern in the ratio shown in the figure.  
			◎ PROGRAM MONITOR ⏀ H PARAB TOP FOLLOW (R214) [WF - 2A] ☆ No change in size when pattern is moved right and left.	5) Adjust R214 so that the wipe pattern does not change in size even when it is moved right and left by the POSITIONER. 6) Set the POSITIONER to "OFF". 7) Performing adjustments following procedure item 4) to 6) in the section 3.13.1-5 "V. parabolic waveform" adjustment.

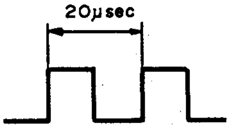
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
7	Softness & border of BKDG mode		 MASK/PST SIZE SOFT BORDER PTN EDGE ASPECT ◎ PROGRAM MONITOR ⦶ BKDG SOFT CENTER (R239) [WF - 2C] ☆ No gap between border and picture	1) Set the Fader lever to the center position. 2) Set the BORDER control to the center (up-right) position. 3) Adjust VR to erase gap between the border and picture inside the border.  Border Picture of PST bus (BACK COLOR) Picture of PGM bus (BLACK)
			 MASK/PST SIZE SOFT BORDER PTN EDGE ASPECT ◎ PROGRAM MONITOR ⦶ H W GATE (R233) [WF - 1C] ⦶ H B GATE (R231) [WF - 2C] ☆ To stabilize border's right and left rims not to be affected with SOFT control.	4) Adjust VRs so that right and left rims of the border do not move being unaffected by turning the SOFT control. 
			◎ PROGRAM MONITOR ⦶ V W GATE (R232) [WF - 1C] ⦶ V B GATE (R230) [WF - 2C] ☆ To stabilize border's up and down rims not to be affected with SOFT control.	5) Adjust VRs so that up and down rims of the border do not move being unaffected by turning the SOFT control.  6) Turn the SOFT control fully counterclockwise.
8	Softness & border of PST PTN (Preset Pattern)		 EFFECTS KEY ON BKGD KEY NEXT EFFECTS MIX WIPE EFFECTS MODE CUT AUTO  MASK/PST SIZE SOFT BORDER PTN EDGE ASPECT	1) Set the Fader lever to the bottommost position. 2) Press the KEY button, and CUT button next. 3) Confirm the KEY ON button lighting.  Border KEY BUS picture (BACK COLOR) PGM BKGD picture (BLACK) Program monitor screen 4) Set the BORDER control to the center (up-right) position. 5) Observing the program monitor, confirm that keying by the preset pattern is in operation.

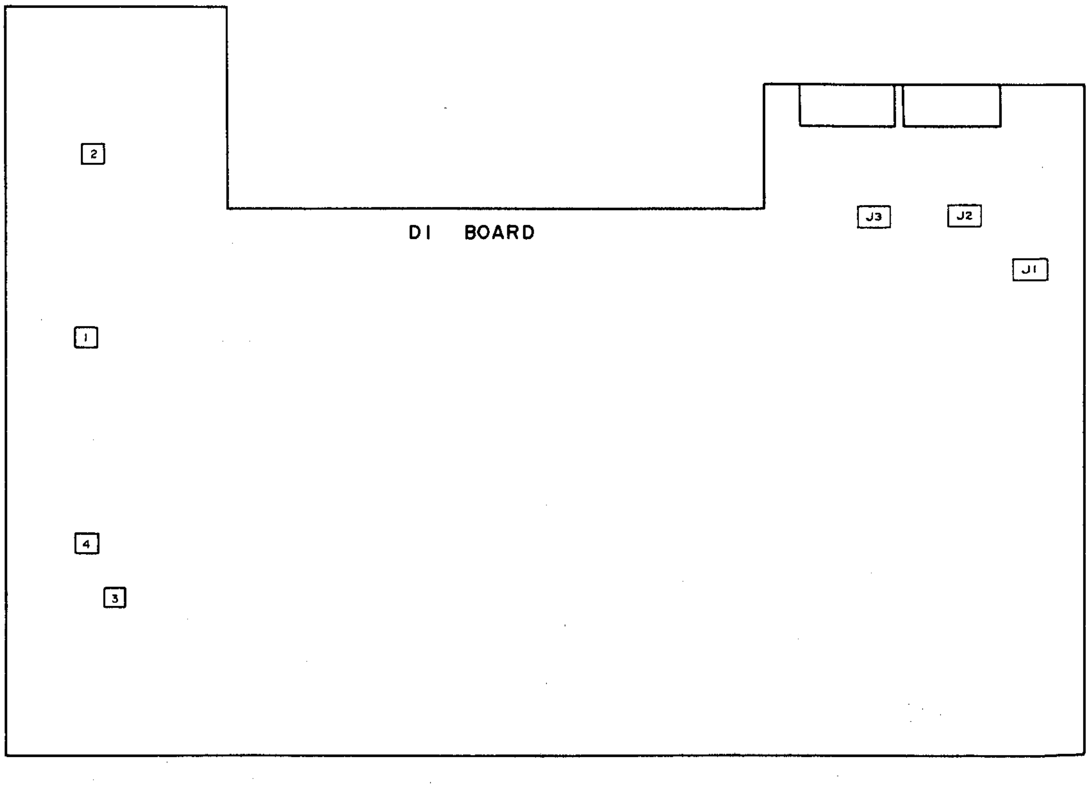
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
			◎ PROGRAM MONITOR ⦶ INV PST W GATE (R234) [WF - 2B] ☆ No gap between border and picture	6) Adjust VR to erase gap between the border and picture inside the border. 
			◎ PROGRAM MONITOR ⦶ KEY SOFT CENTER (R237) [WF - 2C] ☆ No gap	7) With the KEY button pressed, press the BKGD button together with to turn on the both lights. 8) Move the Fader lever to position the BKGD border inside the PST PTN border. 9) Erase outer gap of the BKGD border.  10) Set the Fader lever to the bottommost position.
			 ◎ PROGRAM MONITOR ⦶ H PST W GATE (R229) [WF - 1B] ⦶ H PST B GATE (R227) [WF - 2B] ☆ To stabilize border's right and left rims without affection of the SOFT control.	11) Adjust VRs so that right and left rims of the border do not move being unaffected by turning of the SOFT control. 
			◎ PROGRAM MONITOR ⦶ V PST W GATE (R228) [WF - 1B] ⦶ V PST B GATE (R226) [WF - 2B] ☆ To stabilize border's up and down rims without affection of the SOFT control.	12) Adjust VRs so that up and down rims of the border do not move being unaffected by turning of the SOFT control. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

3.14 ADJUSTMENT OF CONTROL UNIT

- Before starting adjustments, open the control panel according to the procedure described in Section 2.2.

1	Power supply voltage	Digital voltmeter	◎ JK51 pin 3 Ⓣ VR51 [POWER Supply Unit] ☆ 5.2 V	1) Regulate the voltage at the specified level.
2	Clock pulse of A/D converter	Oscilloscope (H-rate, 10 : 1)	◎ IC1 pin 8 [DI] Ⓣ VR1 [DI] ☆ 20 μsec	1) Adjust VR1 to set to the specified period. 
3	Buzzer volume		Ⓣ VR2 [DI] ☆ Set fully counterclockwise	1) At shipment, buzzer volume (VR2) is set to the fully counterclockwise position (maximum volume). Adjust it at user's option.
4	Effect lever	Oscilloscope (H-rate, 10 : 1) (DC input)	◎ IC55 pin 7 Ⓣ VR3 [DI] ☆ 0 V to 5 V according to the EFFECT lever's position.	1) Adjust DC level to alter from 0 V to 5 V when the Fader lever is moved from the bottommost position to the topmost position.
			◎ IC55 pin 7 Ⓣ VR4 [DI] ☆ Same play of EFFECT lever at the topmost and bottommost positions.	2) Adjust the Fader lever to have the same play at the bottommost position (range of 0 V constant) and the topmost position (5 V constant).



3.15 INNER CONNECTORS AND SWITCHERS

- Underlined set position of each item shows that set by factory at shipment.
- Parenthesized symbol ahead page number shows the parts location in the figure. Refer to the mentioned page and block for the parts location.

3.15.1 On the VIDEO board of main unit

- J1 (4-C, page 3-8): PGM Y / KEY Y
- J2 (3-C, page 3-8): PGM R-Y / KEY R-Y
- J3 (2-C, page 3-8): PGM B-Y / KEY B-Y

These connectors select video signal output from PGM 2 OUTPUT connector on the rear panel of the main unit. Respective setting to "PGM" position allows outputting the same picture as PGM 1 OUTPUT, while respective setting to "KEY" position allows outputting the picture selected by KEY BUS select buttons.

3.15.2 On the CP board of main unit

- J1 (1-C, page 3-32) : 6G / 6Y
- J2 (1-C, page 3-32) : 6R / 6R-Y
- J3 (1-C, page 3-32) : 6B / 6B-Y

These are input connectors to the transcoder of INPUT 6. Set to "G, R, B" side respectively when input signals are G/R/B signals. Set to "Y, R-Y, B-Y" side respectively when input signals are Y/R-Y/B-Y component signals.

- J4 (1-C, page 3-32) : 7G / 7Y
- J5 (1-C, page 3-32) : 7R / 7R-Y
- J6 (1-C, page 3-32) : 7B / 7B-Y

These are input connectors to the transcoder of INPUT 7. Set connectors in the same manner as J1 to J3 above.

- J7 (1-C, page 3-32) : 8G / 8Y
- J8 (1-C, page 3-32) : 8R / 8R-Y
- J9 (1-C, page 3-32) : 8B / 8B-Y

These are input connectors to the transcoder of INPUT 8. Set connectors in the same manner as J1 to J3 above.

3.15.3 On the KEY board of main unit

- J1 (1-A, page 3-6) : Y / KEY

This is a switching connector of DSK source selected by DSK source button "7".
When this is set to "Y" position, input signal from KEY 7 connector of the rear panel becomes DSK source.
When set to "KEY" position, Y signal from INPUT 7 connector of the rear panel becomes DSK source.

- J2 (1-A, page 3-6) : Y / KEY

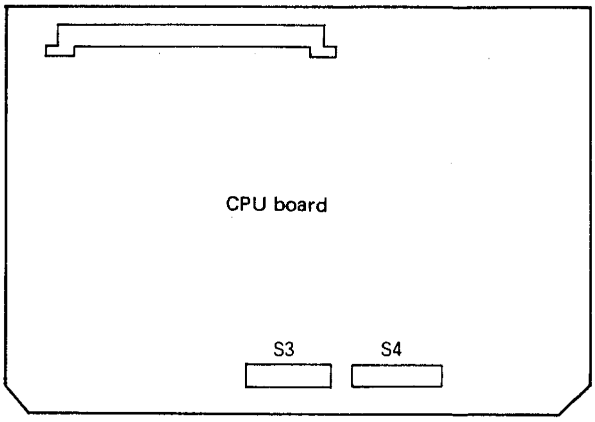
This is a switching connector of DSK source selected by DSK source button "8".
When this is set to "Y" position, input signal from KEY 8 connector of the rear panel becomes DSK source.
When set to "KEY" position, Y signal from INPUT 8 connector of the rear panel becomes DSK source.

3.15.4 On the KSG board of main unit
(NTSC version only)

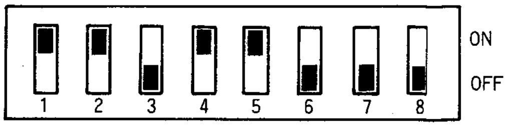
- J1 (2-B, page 3-34) : 358 / 688
- J2 (3-C, page 3-34) : 358 / 688

These connectors are to select signals output from PGM Y/C OUTPUT of the rear panel of the main unit.
When they are set to "358" side respectively, Y/C signal of S-VHS format is output.
When they are set to "688" side respectively, Y/C signal of 3/4" U-VCR format is output.

3.15.5 On the CPU board of main unit



- S3



1. This selects NTSC or PAL by switching.
   ON : NTSC, OFF : PAL

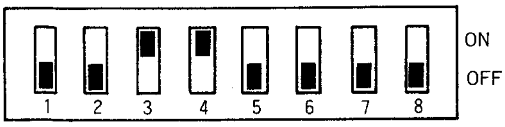
2–4. Used to control KM-3000 by a VTR editor.
   Setting of these switches depend on the specification of a VTR editor used.
   2. ON : STOP BIT 1, OFF : STOP BIT 2
   3. ON : PARITY ENABLE, OFF : PARITY DISABLE
   4. ON : PARITY ODD, OFF : PARITY EVEN

   Note: For connection to SONY's VTR editor BVE-900, set 2 to ON, 3 to ON, 4 to ON, respectively.

5–8. When KM-3000 is controlled by a VTR editor, set one of 5 – 8 to ON according to the transfer time of the editor's serial data communication.
   5. 38.4 K Baud
   6. 19.2 K Baud
   7. 9600 Baud
   8. 4800 Baud

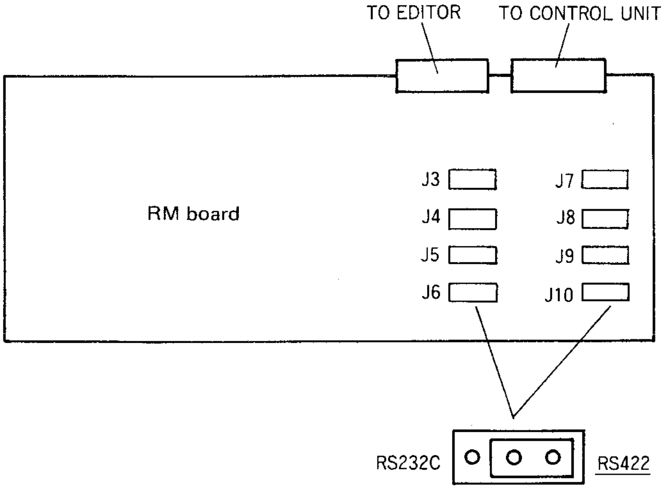
Note: Referring to section 3.15.7, set the connector J1 of the DI board so that it has the same transfer time as that of the editor.

- S4



This is an 8-bit address select switch whose MSB is 1 and LSB is 8.
Set this switch when a VTR editor is connected to be used in combination with.
Setting position at shipment from factory is shown in the above figure (30 HEX).

3.15.6 On the RM board of main unit



- J3 – J6

When a VTR editor is connected to control KM-3000, set these connectors according to the electrical specifications of the editor's connector.

RS232C : When connector's specifications meet RS232C.
RS422 : When connector's specifications meet RS422.

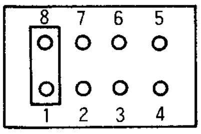
- J7 – J8

Set these connectors according to the electrical specifications of TO EDITOR UNIT's connector.

RS232C : When connector's specifications meet RS232C.
RS422 : When connector's specifications meet RS422.

3.15.7 On the DI board of control unit

- J1

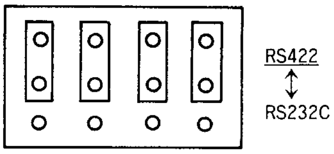


When a VTR editor is connected to control KM-3000, set J1 according to the transfer time of the editor's serial data communication.

1 - 8 : 38.4 K Baud
2 - 7 : 19.2 K Baud
3 - 6 : 9600 Baud
4 - 5 : 4800 Baud

Referring to section 3.15.5, set S3 of the CPU board so that it has the same transfer time.
When the auto fader unit MI-F30 is connected, set the DIP switch inside MI-F30 to meet the specifications. (For details refer to the service manual of MI-F30, page 2-3.)

- J2, J3



Set J2 according to the electrical specifications of TO CONTROL UNIT's connector of the main unit.

Set J3 according to the electrical specifications of the SERIAL INTERFACE connector of MI-F30.

RS232C : When connector's specifications meet RS232C.
RS422 : When connector's specifications meet RS422.

3.16 CORRESPONDENCE WITH BETACAM LEVEL

KM-3000's specifications meet the MII standard level both in input signal and output signal. Therefore, if KM-3000 is used as a unit of a Betacam system, it is required to change the following constants and to perform level adjustments.
When it is used corresponding to the Betacam level, there is a difference between displayed data of COLOR MATTE and actually output signal levels of COLOR MATTE (BDR EFF, BACK COLOR, DSK COLOR).
To meet users' requirements in regard with this problem, it is recently solved by changing the ROM inside the main unit.

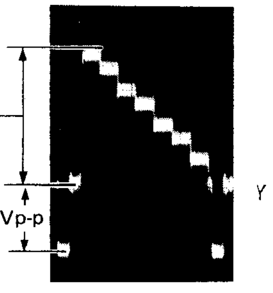
3.16.1 Alteration of constants

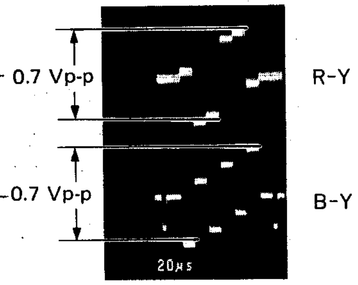
Constants have been changed as follows:

Board	Symbol	Constants		Part No.
		Before alteration	After alteration	
KSG	R27 [KSG - 2A]	1.5 K	2.7 K	QRD161J-272
	NTSC only R35 [KSG - 1A]	330 K	omitted	
	NTSC only R204 [KSG - 1A]	330 K	omitted	

3.16.2 Adjustment procedure

- It is the first condition that all adjustments described previously have been completed.
- For measuring equipment and setup set, refer to the section 3.2. (DC voltmeter and frequency counter are unnecessary.)

No.	**Item**	**Measuring instruments & Input signals**	**Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)**	**Adjustment procedure**
1	Adjustment of preset color bars level	Oscilloscope (H-rate: 10 : 1)	◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ C. BAR Y LEVEL (R19) [KSG - 2A] ☆ NTSC : 0.549 Vp-p PAL : 0.7 Vp-p - - - - - - - - - - - - NTSC only ◎ PGM 1 Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PGM SYNC (R31) [VIDEO - 4C] ☆ 0.286 Vp-p - - - - - - - - - - - - NTSC only ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) Ⓣ PVW SYNC (R32) [VIDEO - 4C] ☆ 0.286 Vp-p	• Take off the top cover to observe the VIDEO board. 1) Use an extension board to extend the KSG board. 2) Set the Fader lever to the bottommost position and reset it referring to section 3.3. (Confirm that there is color bars output.) 3) Adjust Y signal level.  NTSC

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
			◎ PGM 1 R-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⏀ C. BAR R-Y LEVEL (R23) [KSG - 2A] ☆ 0.7 Vp-p ◎ PGM 1 B-Y OUTPUT [Rear panel - Main unit] (with 75-ohm terminator) ⏀ C. BAR B-Y LEVEL (R26) [KSG - 2A] ☆ 0.7 Vp-p	4) Adjust color difference signal level. 
2	Encoder adjustment	Oscilloscope (H-rate: 10 : 1)		• Repeat adjustments of the section 3.12.1, "PGM composite signal output adjustment, steps 3 and 4" and section 3.12.2 "PVW composite signal output adjustment, steps 3 and 4".
3	Transcoder adjustment	Oscilloscope (H-rate: 10 : 1)		• In principle, proceed to adjust according to description in the section 3.11 "TRANSCODER ADJUSTMENT", but some of adjustment level are different as follows. Y signal output level (◎ TP7, ◎ TP8, ◎ TP9) : NTSC 0.549 Vp-p PAL 0.7 Vp-p R-Y signal output level (◎ TP17, ◎ TP18, ◎ TP19) : 0.7 Vp-p B-Y signal output level (◎ TP27, ◎ TP28, ◎ TP29) : 0.7 Vp-p

3.16.3 Replacement of ROMs

Replace IC13, IC14 and IC15 (ROMs) on the DI board of the control unit with those corresponding to the Betacam specifications.

ROM corresponding to Betacam
JVC Part No. : PLSC1020-□□-□□

- -□□-□□ indicates the version. When placing an order of a ROM, make sure of the version number which is the same as that of the ROM to be replaced.

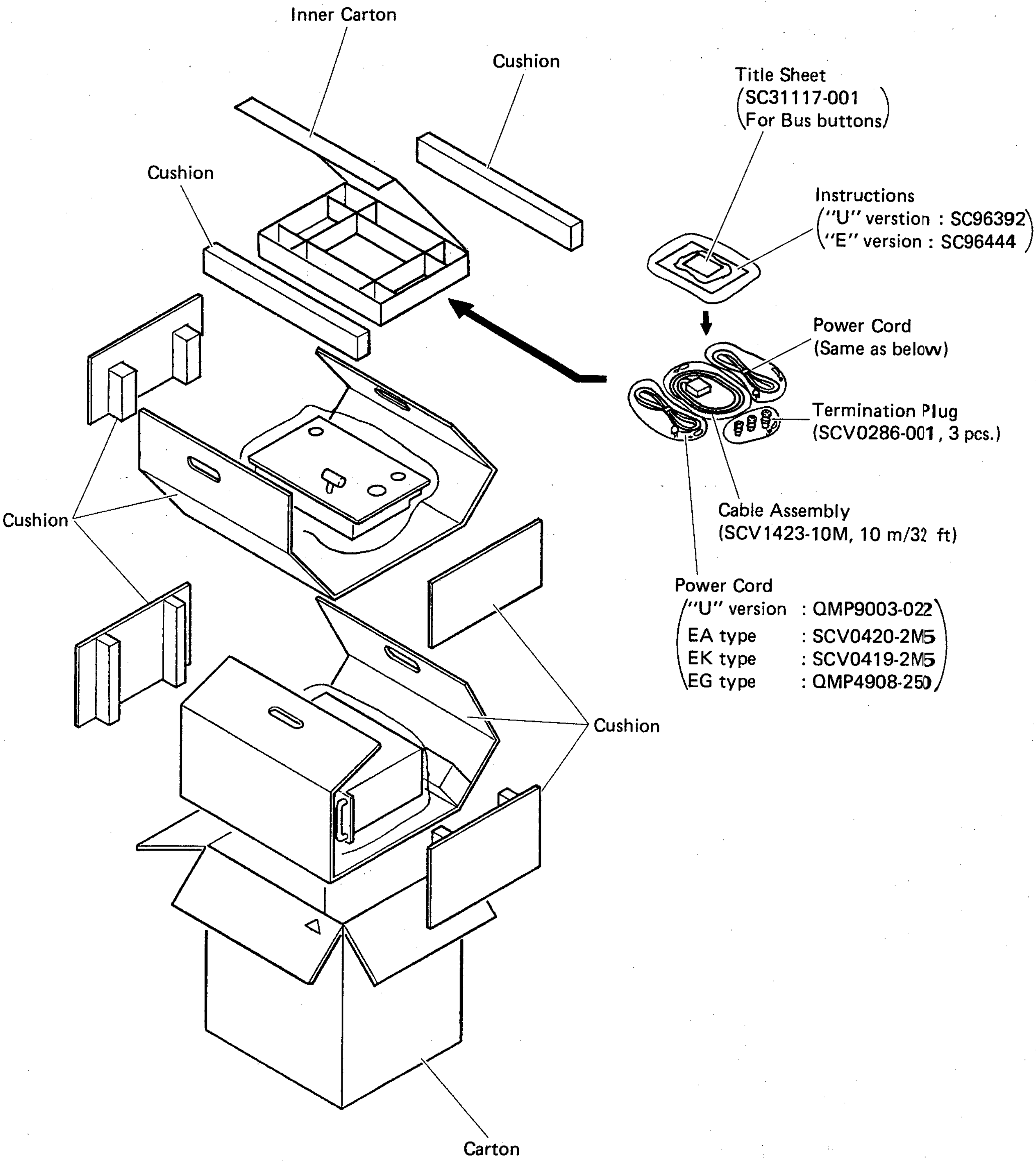
[Example]

Old ROM		New ROM
PLSC1007-V1-00	→	PLSC1020-V1-00

The ROM is supplied in a set (2 pcs. ordinarily, but 3 pcs. for the version-up type).
As the symbol number of each IC is clearly observed, set it correctly.

At replacement, make sure to do electrostatic shielding.

SECTION 4
REPACKING

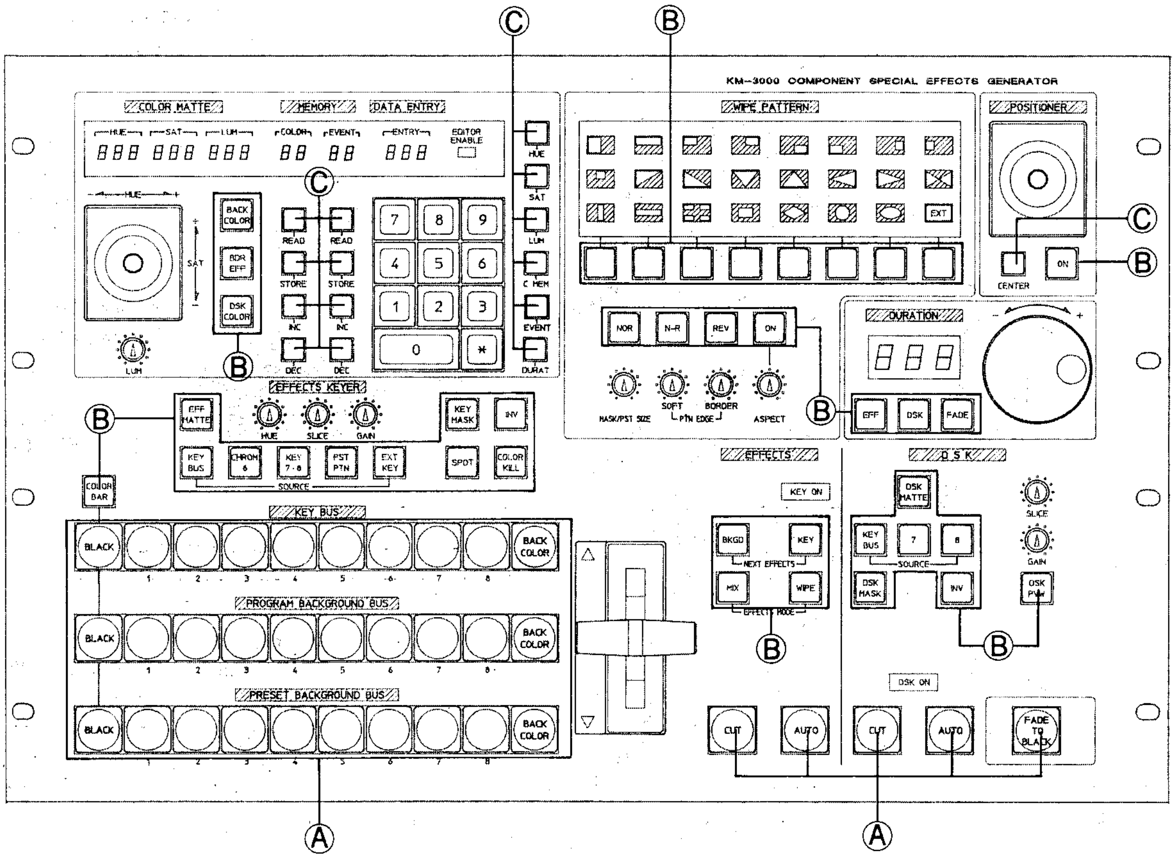

Inner Carton
Cushion
Cushion
Title Sheet
(SC31117-001
For Bus buttons)
Instructions
("U" verstion : SC96392
"E" version : SC96444)
Power Cord
(Same as below)
Termination Plug
(SCV0286-001, 3 pcs.)
Cable Assembly
(SCV1423-10M, 10 m/32 ft)
Cushion
Power Cord
("U" version : QMP9003-022
EA type : SCV0420-2M5
EK type : SCV0419-2M5
EG type : QMP4908-250)
Cushion
Carton

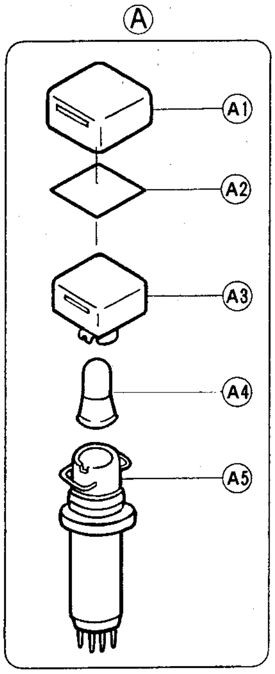
SECTION 5
EXPLODED VIEWS AND PARTS LIST

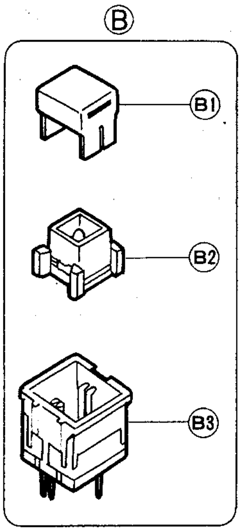
SAFETY PRECAUTION

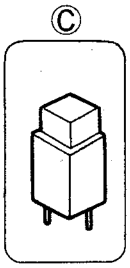
Parts identified by the ▨ symbol are critical for safety.
Replace only with specified part numbers.

5.1 BUTTON ASSEMBLIES OF CONTROL UNIT M1


Ⓒ
Ⓑ
KM-3000 COMPONENT SPECIAL EFFECTS GENERATOR
COLOR MATTE
MEMORY
DATA ENTRY
HUE
SAT
LUM
COLOR
EVENT
ENTRY
EDITOR ENABLE
WIPE PATTERN
POSITIONER
BACK COLOR
BDR EFF
DSK COLOR
READ
STORE
INC
DEC
7
8
9
4
5
6
1
2
3
0
*
C MEM
EVENT
DURAT
EXT
CENTER
ON
NOR
N-R
REV
MASK/PST SIZE
SOFT
BORDER
PTN EDGE
ASPECT
DURATION
EFF
DSK
FADE
EFFECTS KEYER
EFF MATTE
KEY MASK
INV
KEY BUS
CHROM 6
KEY 7·8
PST PTN
EXT KEY
SPOT
COLOR KILL
SOURCE
SLICE
GAIN
COLOR BAR
KEY BUS
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
BLACK
1
2
3
4
5
6
7
8
EFFECTS
KEY ON
BKGD
KEY
NEXT EFFECTS
MIX
WIPE
EFFECTS MODE
D S K
DSK MATTE
DSK MASK
DSK PVW
DSK ON
CUT
AUTO
FADE TO BLACK
Ⓐ
Ⓐ


Ⓐ
A1
A2
A3
A4
A5





- **Button assemblies parts list**

M1MM□□□□

Symbol No.		Part No.	Part Name	Description
A	A 1	SCV1430-001	Cap	
	A 2		Title Sheet	
	A 3		Knob	
	A 4	SCV1431-001	Lamp	
	A 5	SCV1428-001	Push Switch	
B	B 1		Cap	
	B 2	SCV0302-100	Lamp Assembly	
	B 3	SCV1439	Push Switch	
C		SCV1208-000	Push Switch	

A2 parts No.
SC31110-□□□

□□□	Lettering
001	BLACK
002	BACK COLOR
003	CUT
004	AUTO
005	FADE TO BLACK

Title sheets of BUS buttons 1 to 8 are SC31117-001 (Accessory)

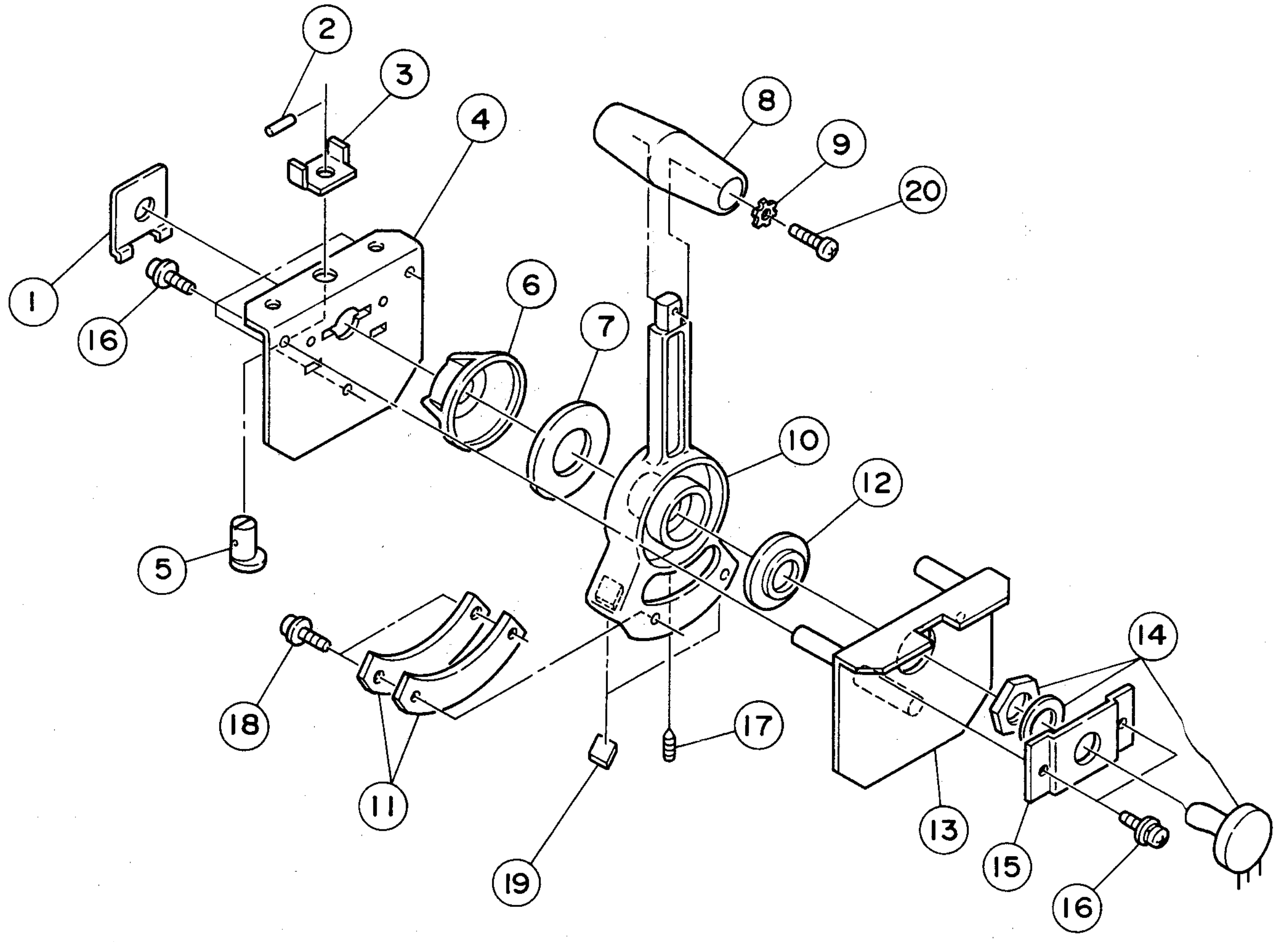
A3 parts No.
SCV1429-□□□

□□□	Color
301	Orange
401	Yellow
901	White

B1 parts No.
- Cap with no lettering
SCV0326-100
- Cap with lettering
SC31109-□□□

□□□	Color	Lettering
301	Orange	BKGD
302		MIX
303		WIPE
401	Yellow	EFF MATTE
402		KEY BUS
403		CHROM 6
404		KEY
405		PST PTN
406		EXT KEY
407		KEY MASK
408		INV
409		SPOT
410		COLOR KILL
411		KEY 7, 8
901	White	COLOR BAR
902		BACK COLOR
903		BDR EFF
904		DSK
905		NOR
906		N-R
907		REV
908		ON
909		EFF
910		FADE
911		DSK MATTE
912		KEY BUS
913		7
914		8
915		DSK MASK
916		INV
917		DSK PVW
918		DSK COLOR

5.2 FADER LEVER ASSEMBLY M2

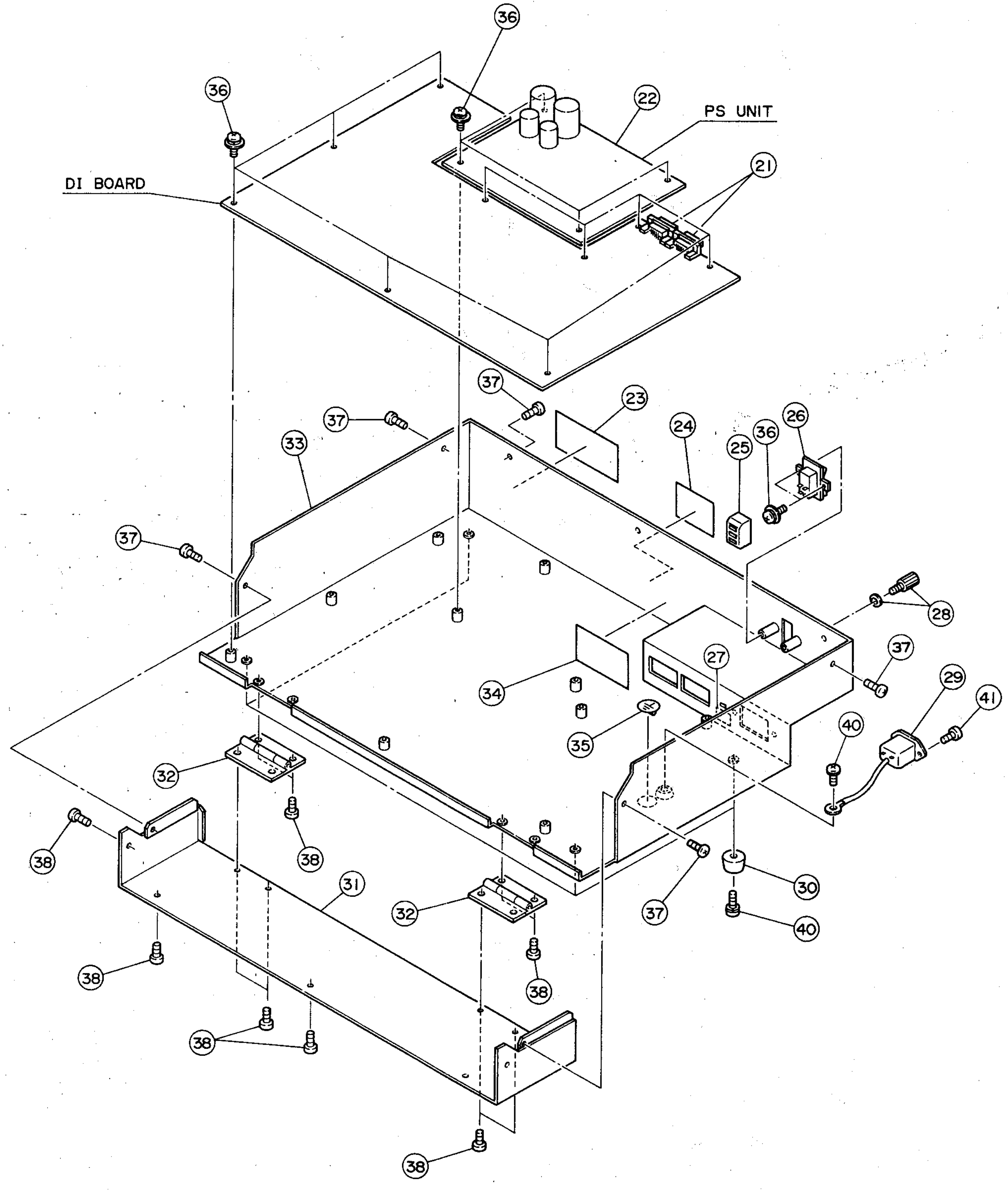


- **Fader lever assembly parts list**

M2MM□□□□

Symbol No.	Part No.	Part Name	Description
1	SC43669-001	Spring Leaf	
2	PRE2014	Spring Pin	
3	SC43859-001	Spring Pressure	
4	SC43668-001	Fader Base (L)	
5	SC43670-001	Eccentric Shaft	
6	SC43667-001	Ring	
7	SC42419-003	Washer	
8	SC43662-001	Fader Knob	
9	WBS3000N	Washer	
10	SC31103-001	Fader Lever	
11	SC43663-001	Plate	
12	SC43666-001	Ring	
13	SC43665-00A	Fader Base (R)	
14	SCV1433-102	VR	1K FADER
15	SC43664-001	VR Bracket	
16	DPSP3006Z	Screw	M3×6
17	YRS3004M	Screw	M3×4
18	DPSP2608Z	Screw	M2.6×8
19	SC40725-001	Rubber Plate	
20	LPSP3008M	Screw	M3 x 8

5.3 CONTROL UNIT ASSEMBLY M 3


36
36
DI BOARD
22
PS UNIT
21
37
37
23
24
25
36
26
33
37
28
37
34
27
29
41
40
35
32
38
38
31
32
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37
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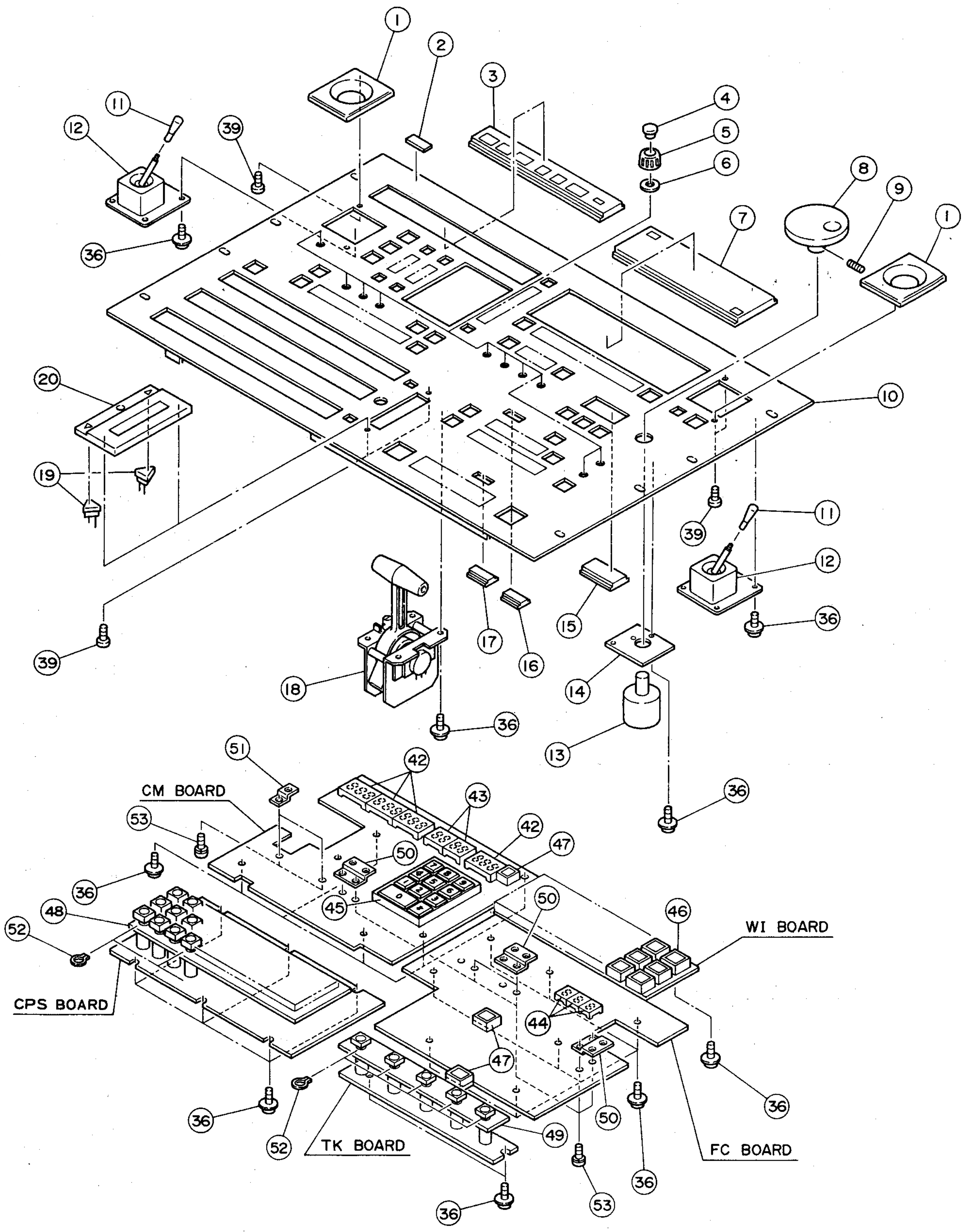
38
38
38
38

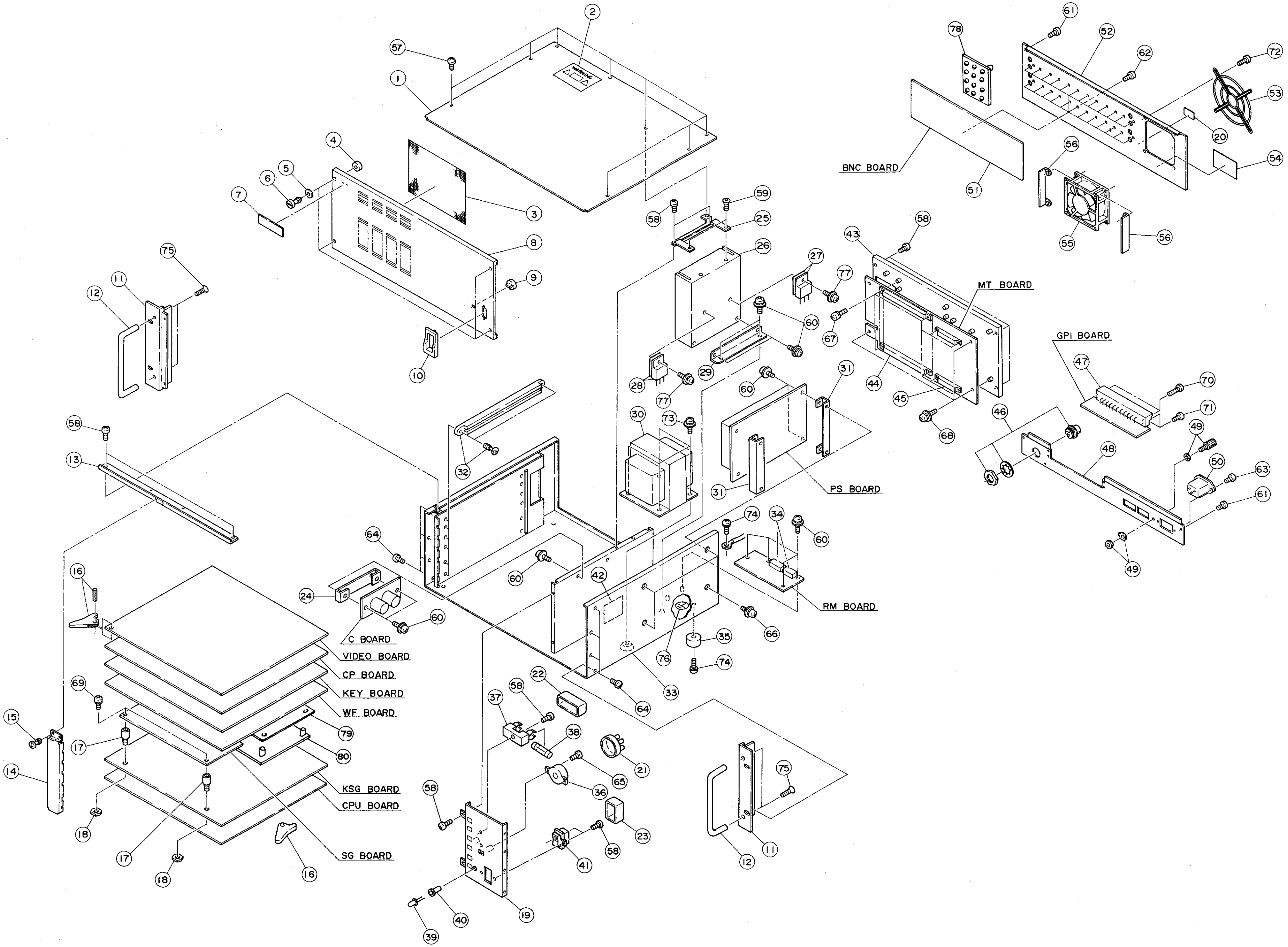

1
2
3
4
5
6
11
12
39
36
8
9
7
1
20
10
19
11
39
12
36
15
17
16
14
39
18
36
13
36
51
42
CM BOARD
43
53
42
47
50
36
45
50
46
WI BOARD
48
52
CPS BOARD
44
47
36
36
52
TK BOARD
49
50
53
36
FC BOARD
36
53

- **Control unit assembly parts list**

M 3 M M ☐ ☐ ☐ ☐

Symbol No.	Part No.	Part Name	Description
1	SC40693-002	Escutcheon	
2	Not Available	Company Logo	30011PGD
3	SC31107-001	Window	C. MATTE/MEM./DATA ENTRY
4	SC40685-021	Knob Cap	
5	SC40683-021	Knob	
6	SC40724-001	Spacer	
7	SC31108-001	Window	WIPE PATTERN
8	SC43674-002	Knob	DURATION
9	YRS3004M	Screw	M3×4
10	SC10090-00A	Control Panel	
11	SC43675-001	Knob	
12	SCV1406	Joy Stick	POSITIONER, HUE/SAT
13	SCV1405-001	Rotary Encoder	DURATION FRAME
14	SC43673-001	Plate	
15	SC43676-001	Window	DURATION
16	SC43677-001	Lamp Cover	KEY ON
17	SC43677-002	Lamp Cover	DSK ON
18	Refer to the section 5.2.	Fader Lever Assembly	
19	GL9PG3	LED	KEY ON, DSK ON
20	SC31104-001	Fader Escutcheon	
21	SCV1469-S09	Connector	TO MAIN UNIT, TO AUDIO INTERFACE
⚠ 22	SCV1424-N01	Power Supply Unit	for "U" version
	SCV1424-P01	Power Supply Unit	for "E" version
23	SC41058-002	Caution label	
24	Not Available	Serial No. Plate	43621SS
⚠ 25	SCV1327-001	Switch Cover	
⚠ 26	QSE2A21-S03	Power Switch	POWER
27	E45358-001	Earth Label	⏚
28	E03619-001	GND Terminal	Include a nut and terminal
⚠ 29	SSV0577	Line Filter	AC INPUT
30	E47227-006	Rubber Foot	
31	SC20371-001	Front Cover	
32	SC40913-002	Hinge	
33	SC10089-00A	Bottom Case	
34	SC41252-001	Caution Label	
35	SC40855-001	Earth Label	⏚
36	DPSP3006Z	Screw	M3×6
37	SDSP3006M	Screw	M3×6
38	SDSP3006R	Screw	M3×6
39	SBSB2606Z	Screw	M2.6×6
40	LPSP4006Z	Screw	M4×6
41	SBST3008M	Screw	M3×8
42	LB-203DL	LED	7 segment. HUE, SAT, LUM, ENTRY
43	LB-202DL	LED	7 segment. COLOR, EVENT
44	LA-401DK	LED	7 segment DURATION
45	SCV1404-001	10-digit key pad	
46	LT-9210H	LED	WIPE PATTERN (Yellow)
47	LT-9210N	LED	DSK ON, KEY ON, EDIT. ENABLE (Green)
48	SC31105-001	Switch Bracket	
49	SC31106-001	Switch Bracket	
50	SC43672-001	VR Bracket	
51	SC43671-001	VR Bracket	
52	SCV1548-001	C Ring	
53	LPSP3006Z	Screw	M3 x 6

5.4 MAIN UNIT ASSEMBLY [M][4]



WARNING
BNC BOARD
MT BOARD
GPI BOARD
PS BOARD
RM BOARD
C BOARD
VIDEO BOARD
CP BOARD
KEY BOARD
WF BOARD
KSG BOARD
CPU BOARD
SG BOARD
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
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- **Main unit assembly parts list**

M4MM☐☐☐☐

Symbol No.	Part No.	Part Name	Description
1	SC20376-001	Top Cover	
2	SC41058-002	Caution Label	
3	SC43826-001	Net	
4	SC40756-001	Stopper	
5	SC40724-001	Spacer	
6	SC40703-001	Screw	
7	Not Available	Company Logo	30011PGD
8	SC20375-001	Front Panel	
9	SM40303-002	LED Lens	
⚠ 10	SC42025-001	Switch Guide	
11	SC31112-001	Side Bracket	
12	SC40702-001	Handle	
13	SC31115-002	Angle	
14	SC31114-002	PCB Holder	
15	SC43397-002	Screw	
16	SCV0296-001	Lever	
17	SC42557-002	Stud	
18	NNS2600N	Nut	
19	SC31164-00A	Panel	
20	SC40865-001	Caution Label	"E" version only
21	SCV1022-001	Cover	
22	SCV0465-001	Cover	
23	SCV1327-001	Cover	
24	SC43934-001	Bracket	
25	SC43714-001	Upper Bracket	
⚠ 26	SCV1427-001	Heat Sink	
⚠ 27	2SC3855(P.Y)	Transistor	PS board Q3
⚠ 28	2SA1491(P.Y)	Transistor	PS board Q4
29	SC43679-001	Lower Bracket	
⚠ 30	SCV1425-001	Power Trans	for "U" version
⚠	SCV1426-001	Power Trans	for "E" version
31	SC43929-001	Bracket	
32	GC41200-041	Guide Rail	Rivet included
33	SC10091-00B	Chassis Assembly	
34	SCV1469-S09	Connector	TO EDITOR, TO CONTROL UNIT
35	E47227-006	Rubber Foot	
⚠ 36	QSR0074-015	Rotary Switch	Voltage Selector
⚠ 37	QMG1321-002	Fuse Holder	
⚠ 38	Refer to the section 2.	Fuse	
39	GL-5HD22	LED	Power indicator
40	SM3512	LED Holder	
⚠ 41	QSE2A21-S03	Power Switch	POWER
42	SC41252-001	Caution Label	
43	SC20372-00A	Bracket	for MT board
44	SCV1196-090	Connector	90 Pin, CN1~6
45	SCV1196-032	Connector	32 Pin, CN7, 8
46	SCV1214-002	Connector	7 Pin Y/C 358
47	SCV1401-001	Terminal	GPI, TALLY
48	SC20373-001	Rear Panel	
49	E03619-001	GND Terminal	GND
⚠ 50	SSV0577	Line Filter	AC INPUT
51	SCV1399	BNC Connector	Pair connector
52	SC20374-001	Rear panel	
⚠ 53	SCV1577-001	Fan Guard	
54	Not Available	Serial No. Plate	43621SS
55	SCV1435-001	Fan Motor	
56	SC43930-001	Bracket	
57	SDSP3006R	Screw	M3×6
58	SBST3006Z	Screw	M3×6
59	SSSP3006N	Screw	M3×6
60	DPSP3006Z	Screw	M3×6

Symbol No.	Part No.	Part Name	Description
61	SBST3006M	Screw	M3×6
62	SBSF3008M	Screw	M3×8
63	SBST3008M	Screw	M3×8
64	SDSP3008R	Screw	M3×8
65	DPSP3008Z	Screw	M3×8
66	DPSP3008N	Screw	M3×8
67	LPSP2610Z	Screw	M2.6×10
68	DPSP2606Z	Screw	M2.6×6
69	LPSP2606Z	Screw	M2.6×6
70	DPSP3025Z	Screw	M3×25
71	DPSP3012Z	Screw	M3×12
72	SDSP4012M	Screw	M4×12
73	DPSP4008Z	Screw	M4×8
74	LPSP4006Z	Screw	M4×6
75	SSSP5012N	Screw	M5×12
76	SC40855-001	Earth Label	⏚
77	DPSP3010Z	Screw	M3 x 10
78	SC31116-001	BNC Plate	
79	SC31195-001	Sheet	
80	SC31194-00A	Shield Plate	

SECTION 6
CHARTS AND DIAGRAMS

SCHEMATIC DIAGRAM NOTES

- **Schematic safety precaution**

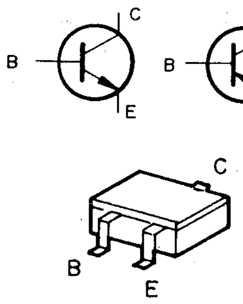
▨ parts are safety related parts.
When replacing them, be sure to use the specified parts.

Voltage: Measured with digital voltmeter in DC range; Input — Color bars signal from test signal generater. (VBS, Full bars and 75% White peak)

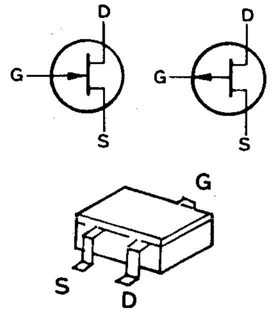
Waveform: Measured with oscilloscope; Input — Color bars signal from test signal generater. (VBS, Full bars and 75% White peak)

- **Chip transistors and FETs**

Transistors

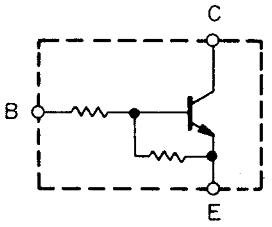


FETs



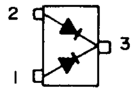
- **Digital Transistor**

DTC124K

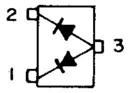


- **Chip diodes**

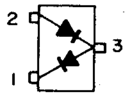
MA152WK



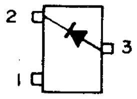
MA152WA

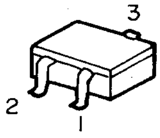


MA153



MA152A

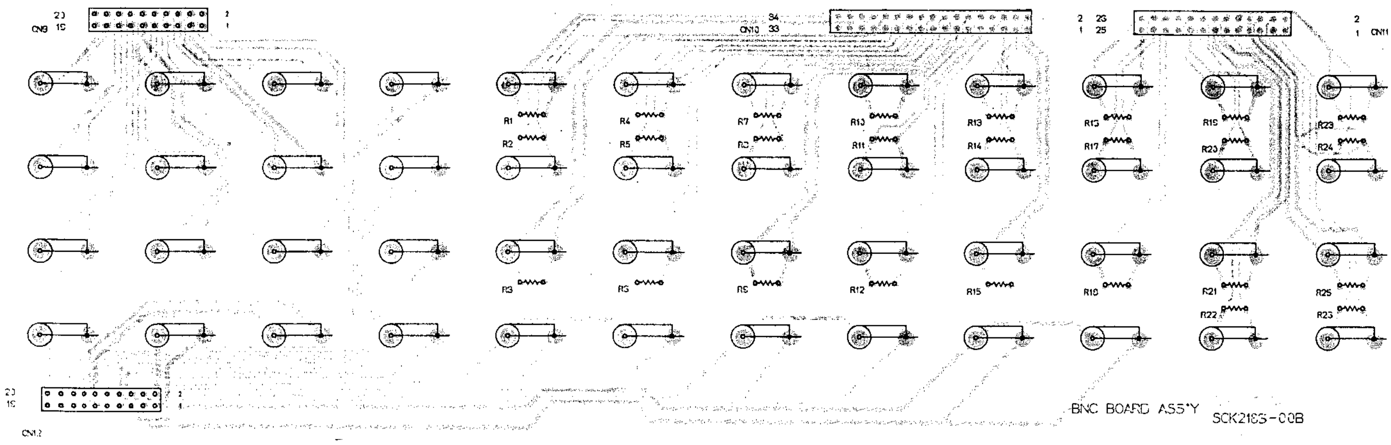




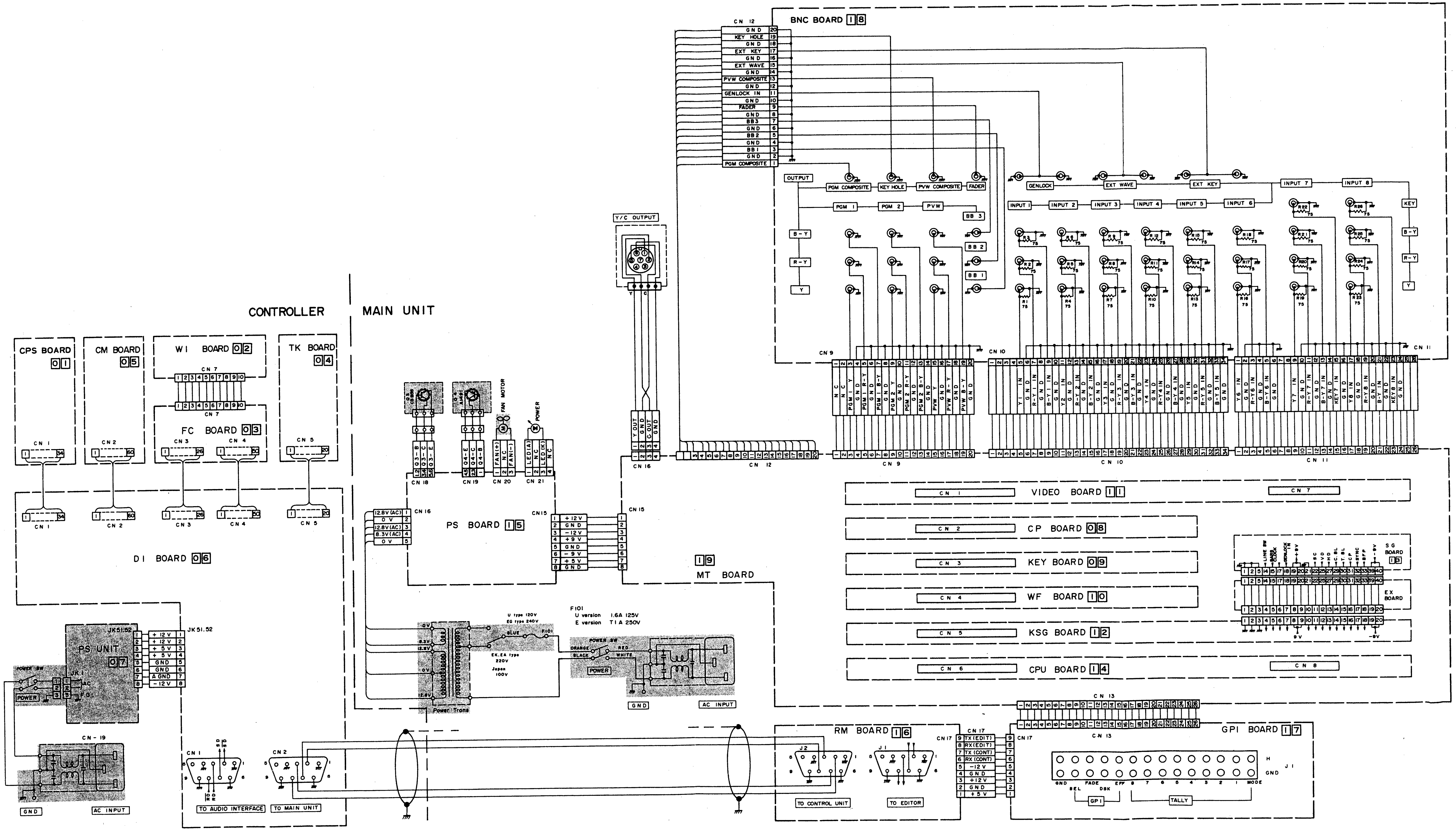
REPLACING SUBMINIATURE "CHIP" PARTS

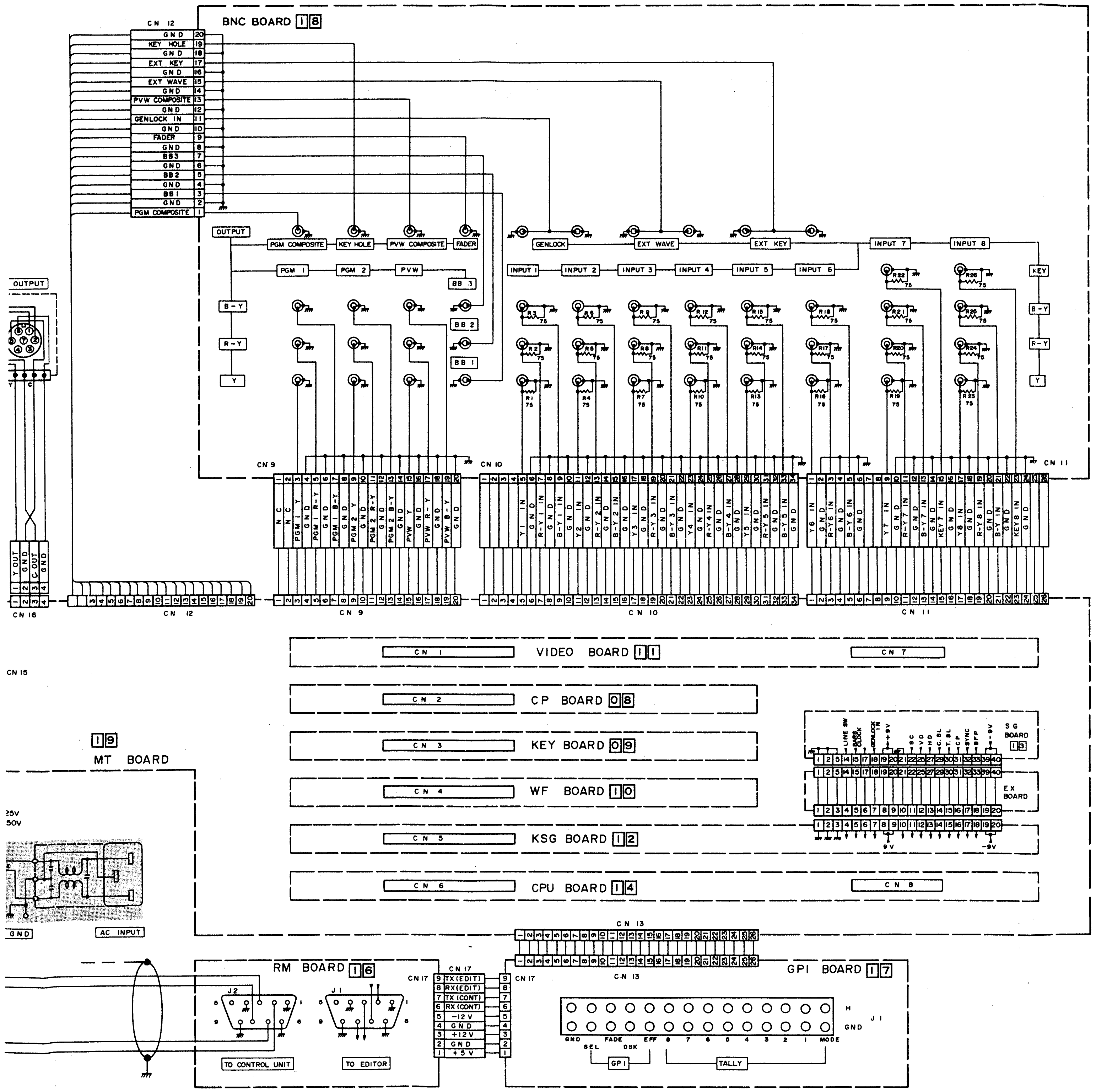
- Some resistors, shoring jumpers (0 Ω resistance), ceramic capacitors, transistors, and diodes are chip parts. These chip parts cannot be reused after they are once removed.
- Soldering cautions:
  1) Do not apply heat for more than 3 seconds.
  2) Avoid using a rubbing stroke when soldering.
  3) Discard removed chips; do not reuse them.
  4) Supplementary cementing is not required.
  5) Use care not to scratch or otherwise damage the chips.
- Resistors and capacitors are not interchangeable with chip parts which is used in the color cameras BY-110, KY-210, etc., because of size difference. In case of part order, refer to the section "ELECTRICAL PARTS LIST".

6.1 BNC CIRCUIT BOARD (Soldered side view) — Main Unit —


CN9
20
19
2
1
CN10
34
33
2
1
26
25
2
1
CN11
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
20
19
2
1
CN12
BNC BOARD ASS'Y
SCK2183-00B

6.2 OVERALL WIRINGS

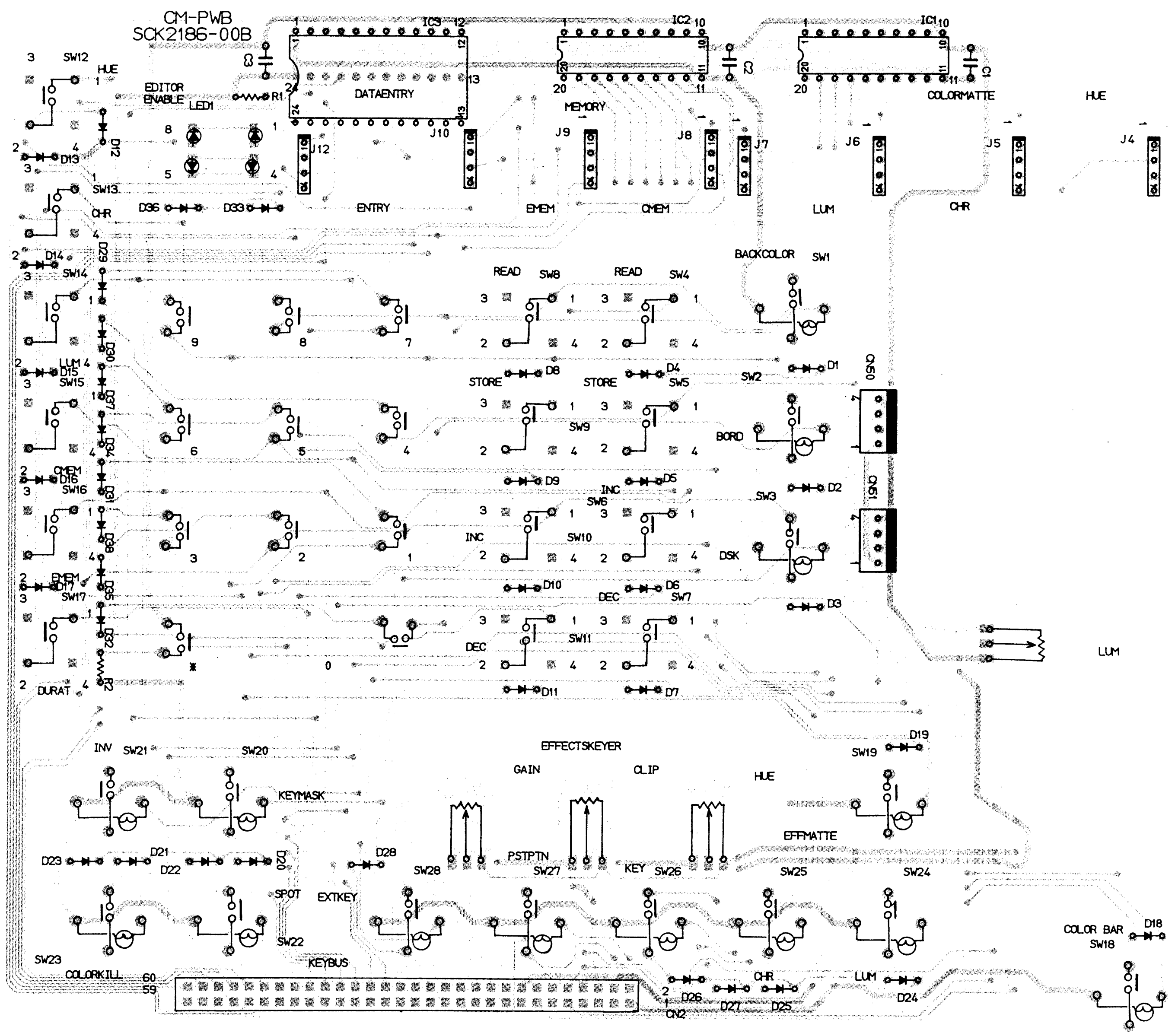

CONTROLLER
MAIN UNIT
CPS BOARD 01
CM BOARD 05
WI BOARD 02
TK BOARD 04
FC BOARD 03
DI BOARD 06
PS UNIT 07
JK51.52
POWER SW
POWER
CN-19
GND
AC INPUT
TO AUDIO INTERFACE
TO MAIN UNIT
PS BOARD 15
CN 18
CN 19
CN 20
CN 21
CN 16
CN15
FAN MOTOR
POWER
Power Trans
F101
U version 1.6A 125V
E version T1A 250V
U type 120V
EG type 240V
EK.EA type 220V
Japan 100V
19 MT BOARD
Y/C OUTPUT
BNC BOARD 18
CN 12
OUTPUT
PGM COMPOSITE
KEY HOLE
PVW COMPOSITE
FADER
GENLOCK
EXT WAVE
EXT KEY
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT 8
PGM 1
PGM 2
PVW
BB 1
BB 2
BB 3
B-Y
R-Y
Y
KEY
CN 9
CN 10
CN 11
VIDEO BOARD 11
CP BOARD 08
KEY BOARD 09
WF BOARD 10
KSG BOARD 12
CPU BOARD 14
SG BOARD 13
EX BOARD
CN 13
RM BOARD 16
TO CONTROL UNIT
TO EDITOR
GPI BOARD 17
GPI
TALLY


BNC BOARD 18
CN 12
GND
KEY HOLE
EXT KEY
EXT WAVE
PVW COMPOSITE
GENLOCK IN
FADER
BB3
BB2
BB1
PGM COMPOSITE
OUTPUT
PGM 1
PGM 2
PVW
BB 3
BB 2
BB 1
B-Y
R-Y
Y
GENLOCK
EXT WAVE
EXT KEY
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT 8
KEY
CN 9
CN 10
CN 11
CN 16
Y OUT
C OUT
CN 15
VIDEO BOARD 11
CN 1
CN 7
CP BOARD 08
CN 2
KEY BOARD 09
CN 3
WF BOARD 10
CN 4
KSG BOARD 12
CN 5
CPU BOARD 14
CN 6
CN 8
SG BOARD 13
EX BOARD
19
MT BOARD
GND
AC INPUT
CN 13
RM BOARD 16
J2
J1
TO CONTROL UNIT
TO EDITOR
CN 17
TX (EDIT)
RX (EDIT)
TX (CONT)
RX (CONT)
-12 V
+12 V
+5 V
GPI BOARD 17
H
GND
SEL
FADE
DSK
EFF
MODE
GPI
TALLY

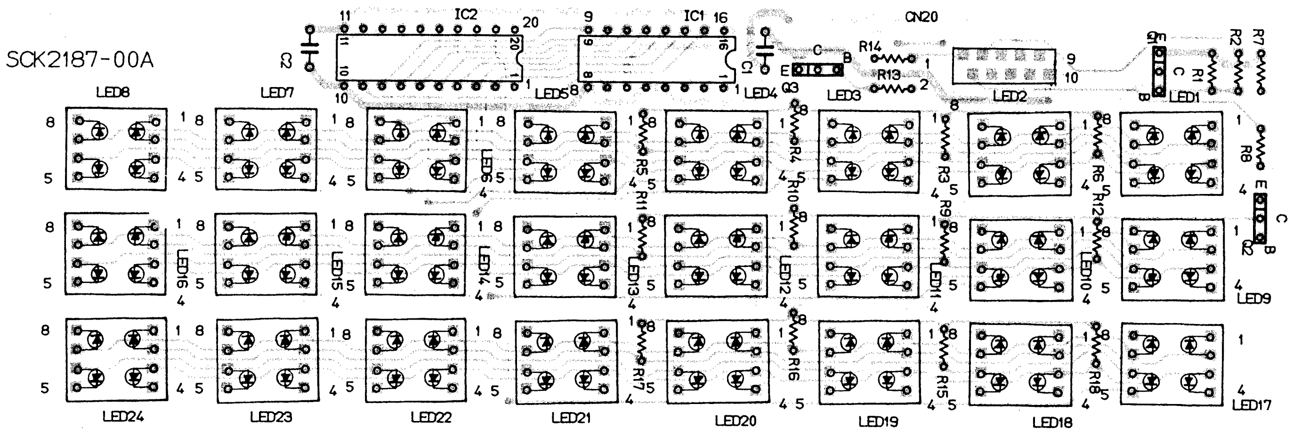
6.3 CM/CPS/WI/FC/TK CIRCUIT BOARD (Soldered side view)

– Control Unit –

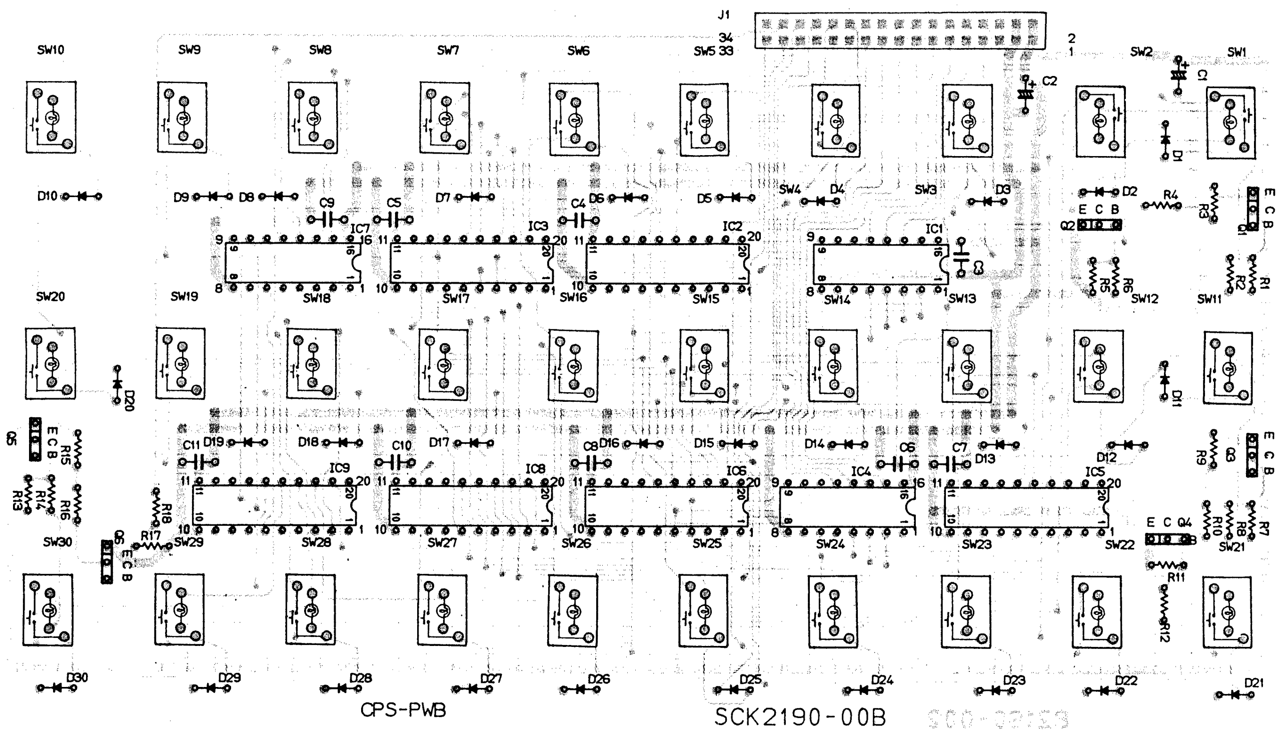
● CM board


CM-PWB
SCK2186-00B
IC1
IC2
IC3
EDITOR ENABLE
LED1
DATAENTRY
MEMORY
COLORMATTE
HUE
ENTRY
EMEM
CMEM
LUM
CHR
BACKCOLOR
READ
STORE
INC
DEC
BORD
DSK
EFFECTSKEYER
GAIN
CLIP
KEYMASK
PSTPTN
KEY
EFFMATTE
SPOT
EXTKEY
KEYBUS
COLORKILL
COLOR BAR
DURAT
INV

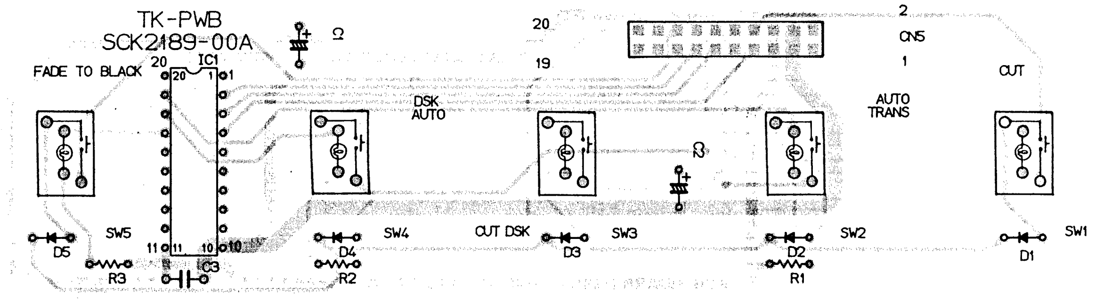
● WI boatd


SCK2187-00A
IC1
IC2
CN20
LED1
LED2
LED3
LED4
LED5
LED6
LED7
LED8
LED9
LED10
LED11
LED12
LED13
LED14
LED15
LED16
LED17
LED18
LED19
LED20
LED21
LED22
LED23
LED24

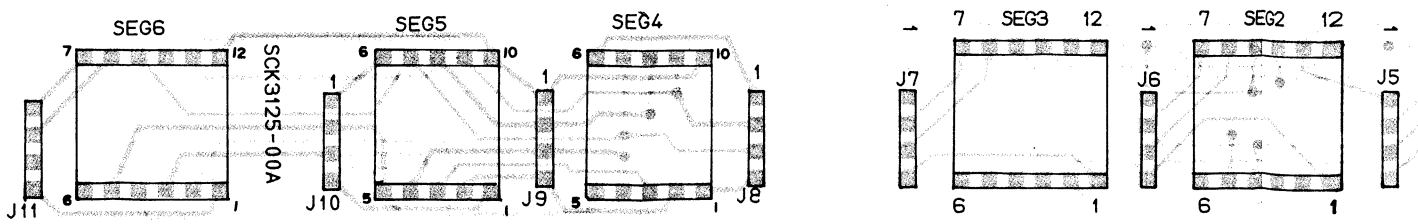
● CPS board


J1
CPS-PWB
SCK2190-00B
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9

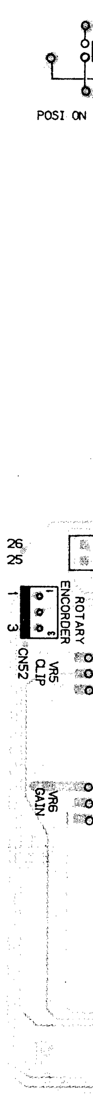
● TK board


TK-PWB
SCK2189-00A
FADE TO BLACK
IC1
DSK AUTO
CN5
AUTO TRANS
CUT
CUT DSK
SW1
SW2
SW3
SW4
SW5

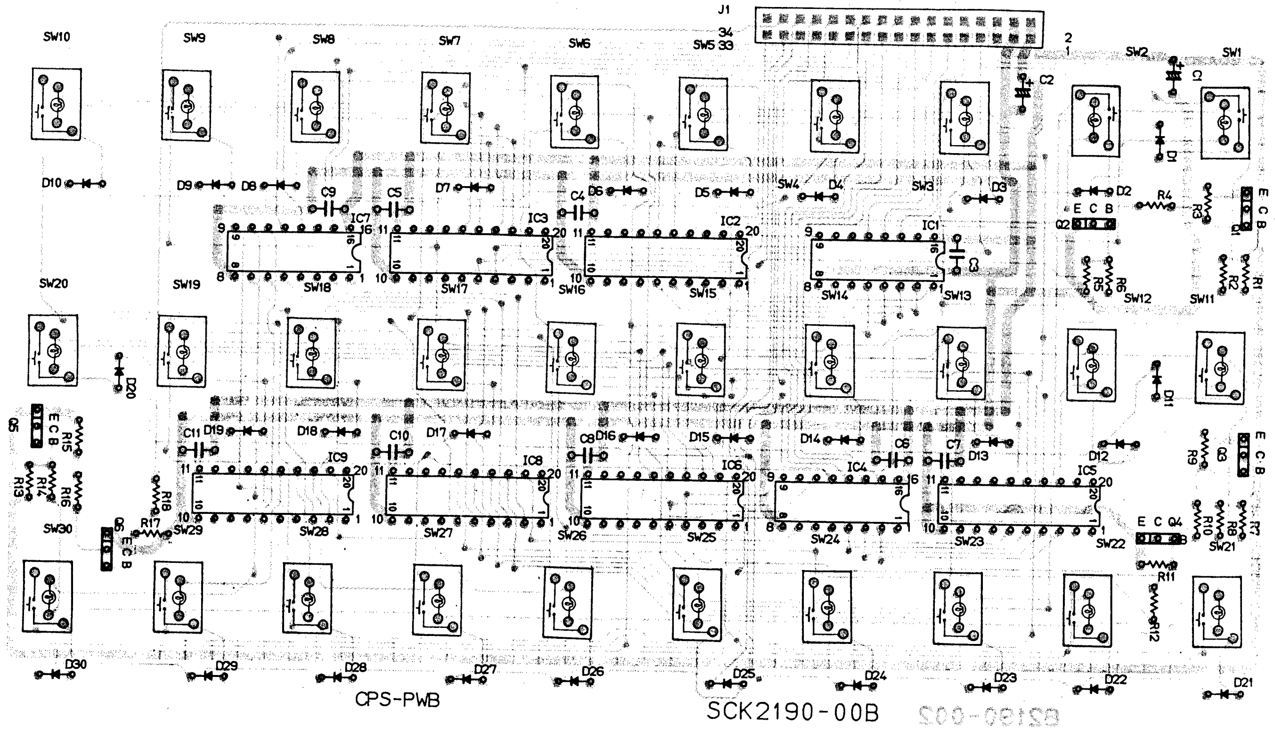
● 7 SEGMENT LED board ass'y


SEG6
SEG5
SEG4
SEG3
SEG2
SCK3125-00A
J5
J6
J7
J8
J9
J10
J11

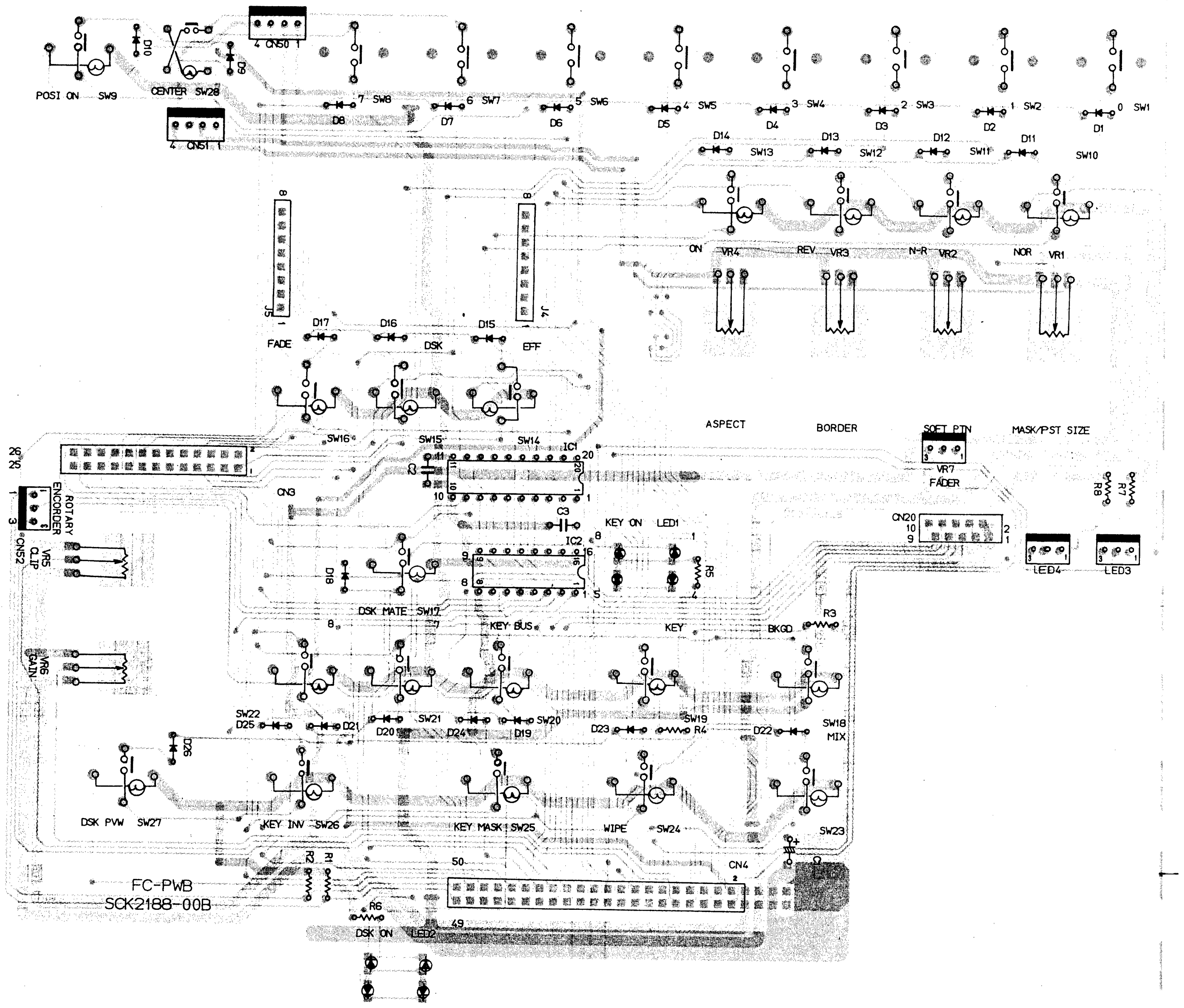
● F


POSI ON
ROTARY ENCODER
CN52
VR6 GAIN

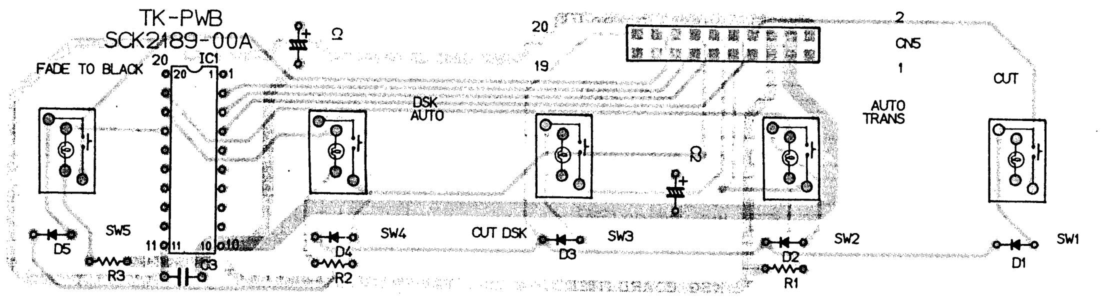
● CPS board


J1
CPS-PWB
SCK2190-00B
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
SW16
SW17
SW18
SW19
SW20
SW21
SW22
SW23
SW24
SW25
SW26
SW27
SW28
SW29
SW30
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
J4

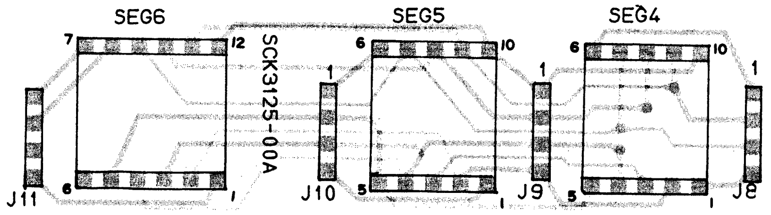
● FC board

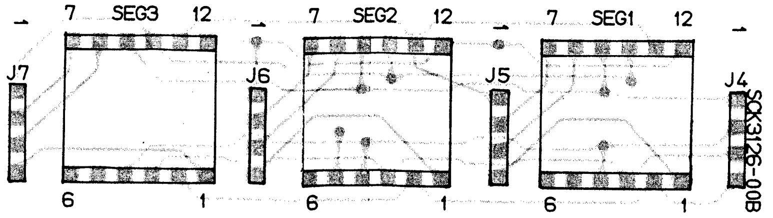

POSI ON
SW9
CENTER
SW28
CN50
CN51
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
SW13
SW12
SW11
SW10
ON
VR4
REV
VR3
N-R
VR2
NOR
VR1
J5
J6
FADE
DSK
EFF
ASPECT
BORDER
SOFT PTN
MASK/PST SIZE
VR7
FADER
SW16
SW15
SW14
IC1
CN3
ROTARY ENCORDER
CN52
VR5 CLIP
VR6 GAIN
KEY ON
LED1
IC2
CN20
LED4
LED3
DSK MATE
SW17
KEY BUS
KEY
BKGD
SW22
SW21
SW20
SW19
SW18
MIX
DSK PVW
SW27
KEY INV
SW26
KEY MASK
SW25
WIPE
SW24
SW23
CN4
FC-PWB
SCK2188-00B
DSK ON
LED2

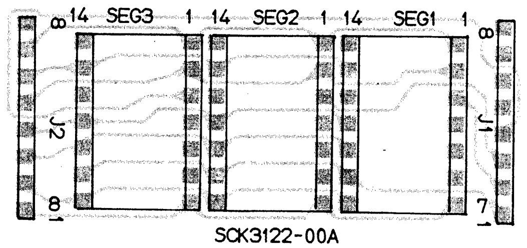
● TK board


TK-PWB
SCK2189-00A
FADE TO BLACK
IC1
CN5
DSK AUTO
AUTO TRANS
CUT
SW5
SW4
CUT DSK
SW3
SW2
SW1

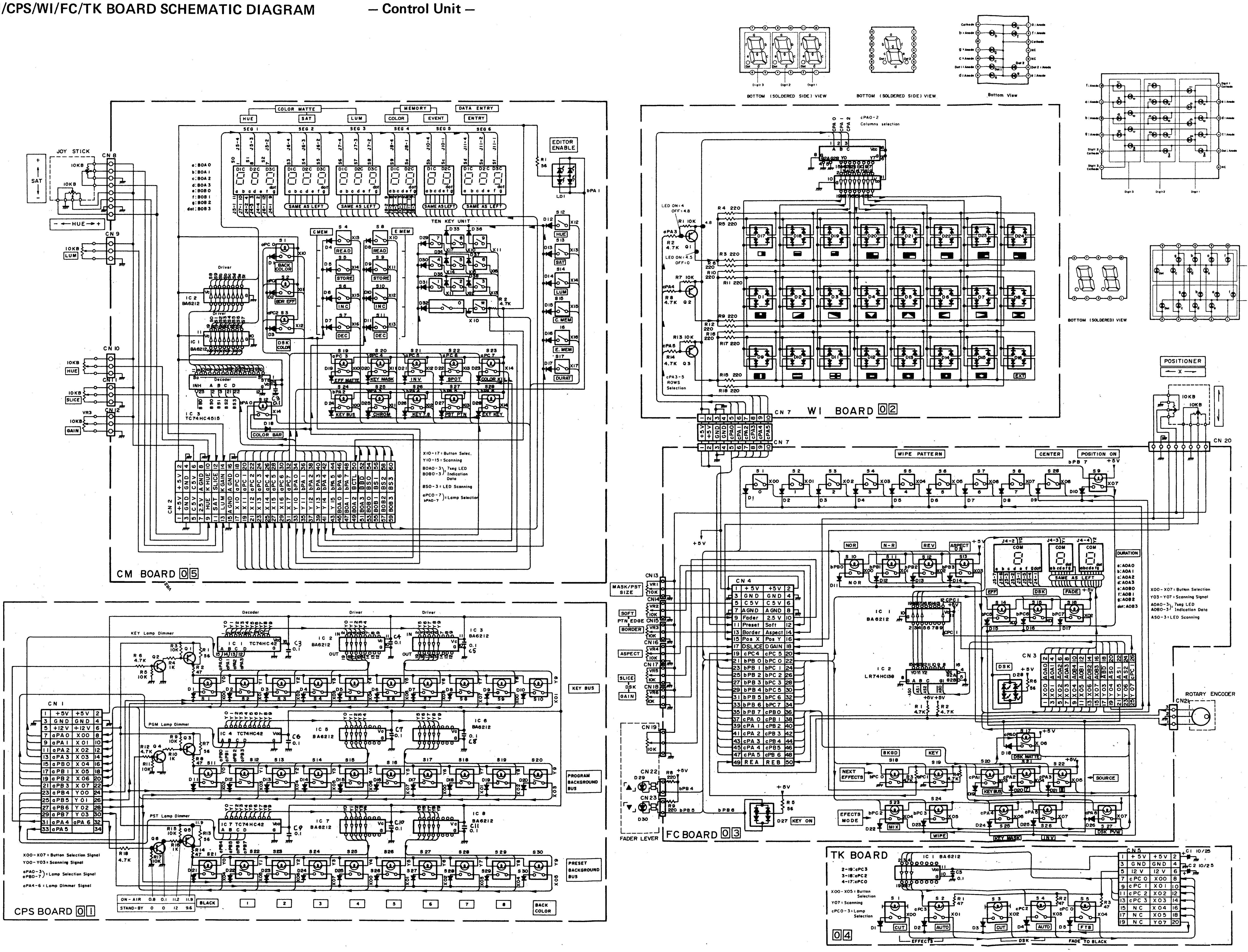
● 7 SEGMENT LED board ass'y


SEG6
SEG5
SEG4
SCK3125-00A
J11
J10
J9
J8

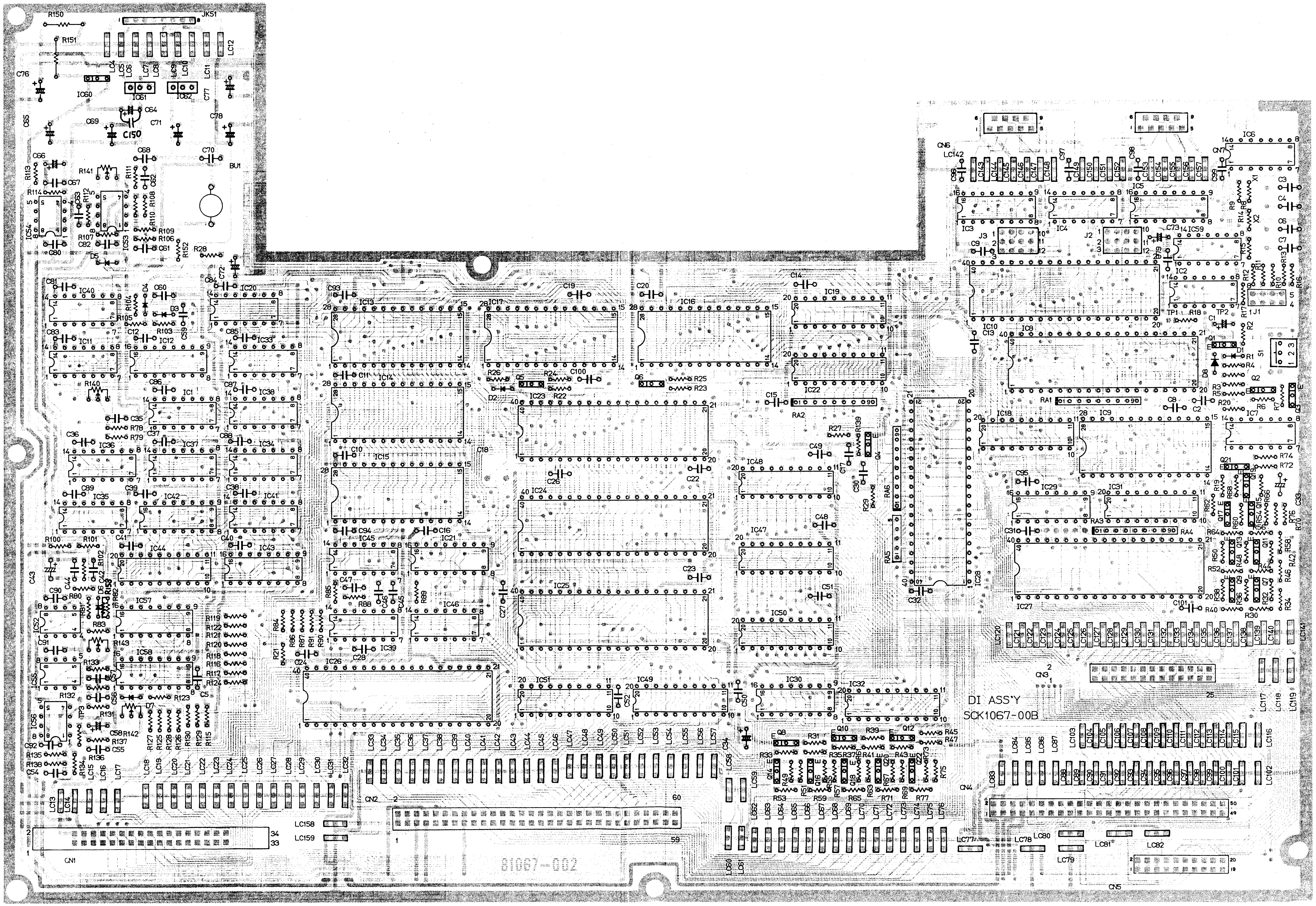

SEG3
SEG2
SEG1
J7
J6
J5
J4
SCK3126-00B


SEG3
SEG2
SEG1
J2
J1
SCK3122-00A

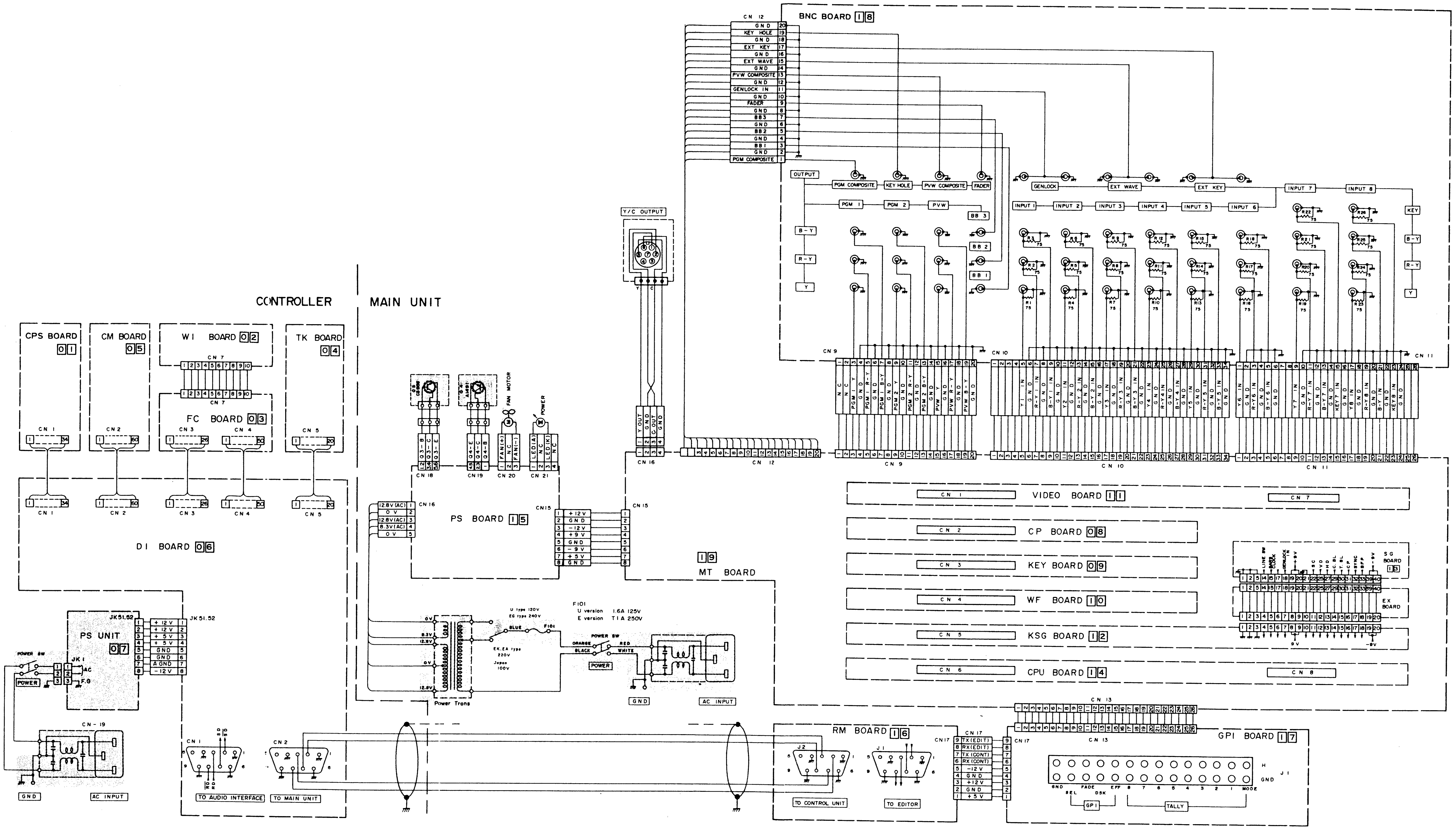
6.4 CM/CPS/WI/FC/TK BOARD SCHEMATIC DIAGRAM – Control Unit –


BOTTOM (SOLDERED SIDE) VIEW
BOTTOM (SOLDERED SIDE) VIEW
Bottom View
BOTTOM (SOLDERED) VIEW
JOY STICK
SAT
HUE
LUM
SLICE
GAIN
COLOR MATTE
MEMORY
DATA ENTRY
COLOR
EVENT
ENTRY
EDITOR ENABLE
TEN KEY UNIT
CMEM
EMEM
READ
STORE
INC
DEC
BACK COLOR
BDR EFF
DSK COLOR
EFF MATTE
KEY MASK
INV
SPOT
COLOR KILL
KEY BUS
CHROM
KEY 7,8
PST PTN
EXT KEY
COLOR BAR
IC 1 BA6212
IC 2 BA6212
IC 3 TC74HC4515
X10-17 = Button Selec.
Y10-15 = Scanning
B0A0-3
B0B0-3 = 7seg LED Indication Data
BS0-3 = LED Scanning
aPC0-7
bPA0-7 = Lamp Selection
CM BOARD 05
CN 7
WI BOARD 02
LED ON: 4
OFF: 4.8
LED ON: 4.5
OFF: 0
cPA3-5 ROWS Selection
cPA0-2 Columns selection
POSITIONER
CN 20
WIPE PATTERN
CENTER
POSITION ON
MASK/PST SIZE
SOFT
PTN EDGE
BORDER
ASPECT
SLICE
DSK GAIN
FADER LEVER
NOR
N-R
REV
ASPECT
DURATION
a: A0A0
b: A0A1
c: A0A2
d: A0A3
e: A0B0
f: A0B1
g: A0B2
dot: A0B3
X00-X07 = Button Selection
Y03-Y07 = Scanning Signal
A0A0-3
A0B0-3 = 7seg LED Indication Data
AS0-3 = LED Scanning
EFF
DSK
FADE
DSK MATTE
BKGD
KEY
NEXT EFFECTS
EFECTS MODE
MIX
WIPE
KEY BUS
KEY MASK
INV
SOURCE
DSK PVW
KEY ON
ROTARY ENCODER
FC BOARD 03
TK BOARD
2-19: cPC3
3-18: cPC2
4-17: cPC0
X00-X05 = Button Selection
Y07 = Scanning
cPC0-3 = Lamp Selection
CUT
AUTO
FTB
EFFECTS
DSK
FADE TO BLACK
04
CPS BOARD 01
KEY Lamp Dimmer
PGM Lamp Dimmer
PST Lamp Dimmer
Decoder
Driver
IC 1 TC74HC42
IC 4 TC74HC42
IC 7 TC74HC42
KEY BUS
PROGRAM BACKGROUND BUS
PRESET BACKGROUND BUS
X00-X07 = Button Selection Signal
Y00-Y03 = Scanning Signal
aPA0-3
aPB0-7 = Lamp Selection Signal
aPA4-6 = Lamp Dimmer Signal
ON-AIR
STAND-BY
BLACK
1
2
3
4
5
6
7
8
BACK COLOR

6.5 DI CIRCUIT BOARD (Parts side view) — Control Unit —


DI ASS'Y
SCK1067-00B
81067-002
JK51
BU1
CN1
CN2
CN3
CN4
CN5
CN6
CN7
J1
J2
J3
TP1
TP2
TP3
X1
X2
S1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
IC36
IC37
IC38
IC39
IC40
IC41
IC42
IC43
IC44
IC45
IC46
IC47
IC48
IC49
IC50
IC51
IC52
IC53
IC54
IC55
IC56
IC57
IC58
IC59
IC60
IC61
IC62
RA1
RA2
RA3
RA4
RA5
RA6
C150
LC158
LC159
LC77
LC78
LC79
LC80
LC81
LC82

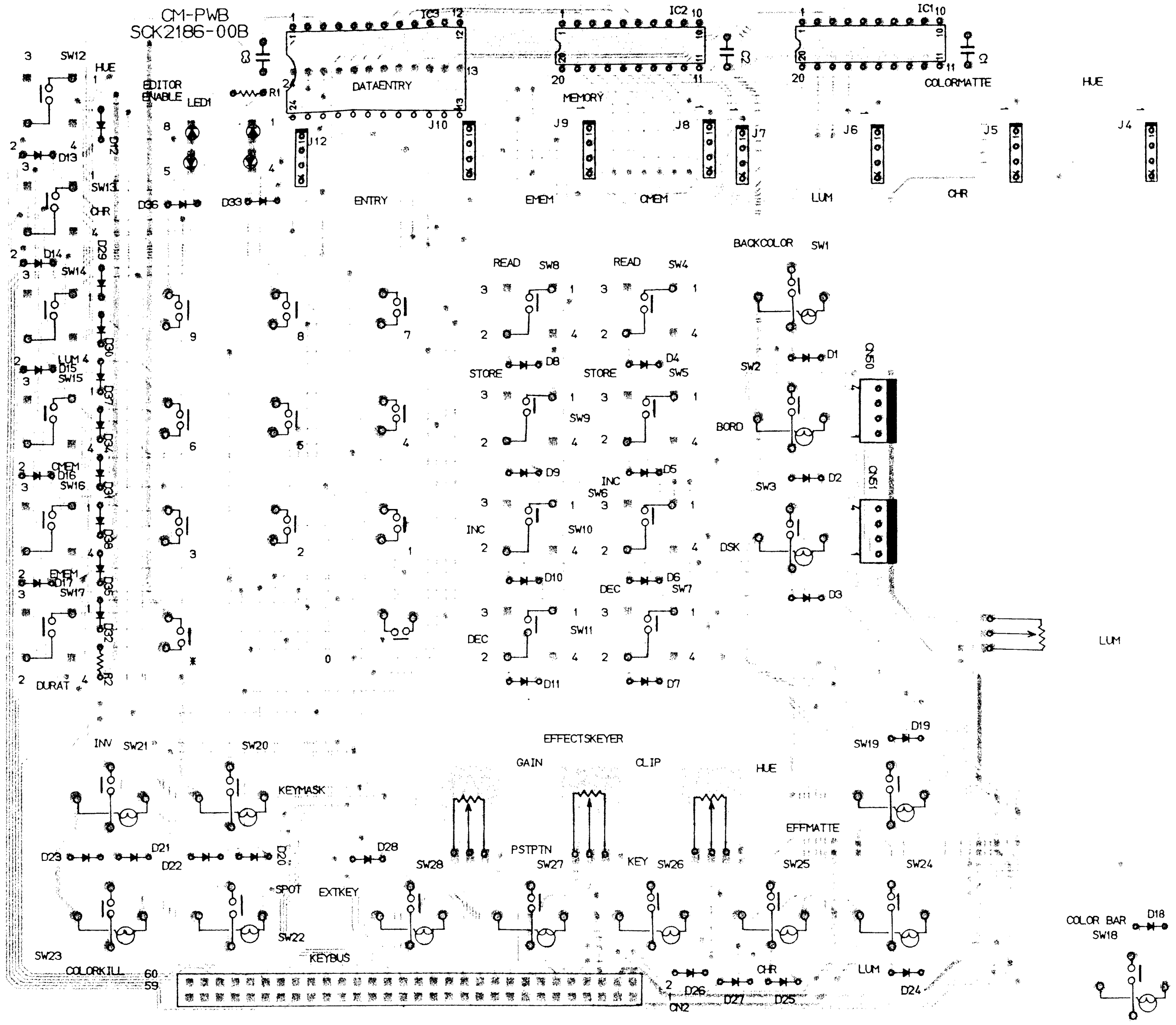
6.2 OVERALL WIRINGS


CONTROLLER
MAIN UNIT
CPS BOARD 01
CM BOARD 05
WI BOARD 02
TK BOARD 04
FC BOARD 03
DI BOARD 06
CN 1
CN 2
CN 3
CN 4
CN 5
CN 7
PS UNIT 07
JK51.52
JK 1
POWER SW
POWER
CN-19
GND
AC INPUT
+12 V
+5 V
GND
A GND
-12 V
TO AUDIO INTERFACE
TO MAIN UNIT
CN 16
CN 18
CN 19
CN 20
CN 21
FAN MOTOR
POWER
PS BOARD 15
CN15
12.8V(AC)
0 V
8.3V(AC)
+12 V
-12 V
+9 V
-9 V
+5 V
Power Trans
U type 120V
EG type 240V
EK.EA type 220V
Japan 100V
BLUE
F101
U version 1.6A 125V
E version T1A 250V
ORANGE
BLACK
RED
WHITE
MT BOARD 19
Y/C OUTPUT
Y OUT
C OUT
BNC BOARD 18
CN 12
KEY HOLE
EXT KEY
EXT WAVE
PVW COMPOSITE
GENLOCK IN
FADER
BB 3
BB 2
BB 1
PGM COMPOSITE
OUTPUT
PGM 1
PGM 2
PVW
GENLOCK
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT 8
KEY
B-Y
R-Y
Y
CN 9
CN 10
CN 11
VIDEO BOARD 11
CP BOARD 08
KEY BOARD 09
WF BOARD 10
KSG BOARD 12
CPU BOARD 14
CN 6
CN 8
SG BOARD 13
EX BOARD
RM BOARD 16
J1
J2
CN 17
TX(EDIT)
RX(EDIT)
TX(CONT)
RX(CONT)
TO CONTROL UNIT
TO EDITOR
GPI BOARD 17
CN 13
GPI
TALLY
MODE

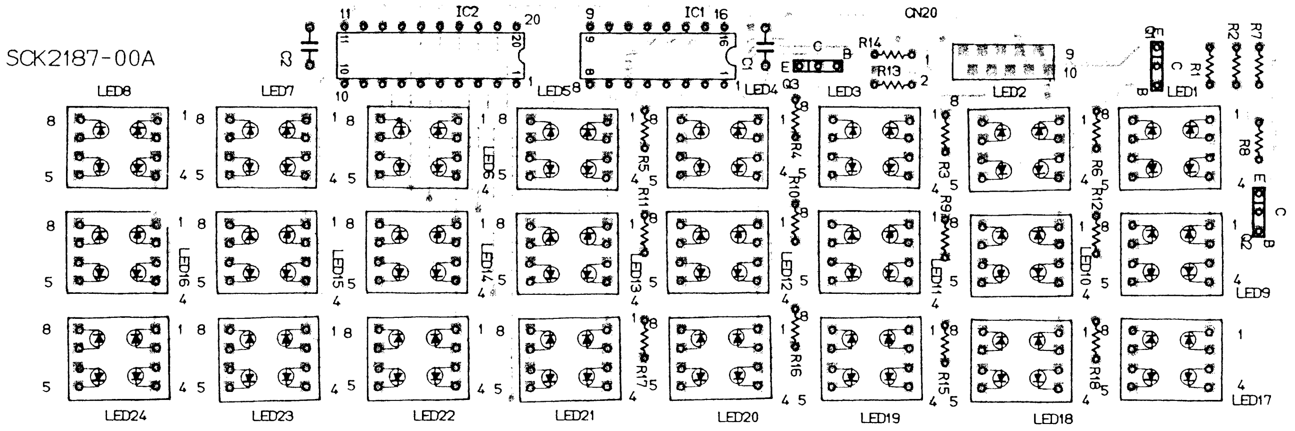
6.3 CM/CPS/WI/FC/TK CIRCUIT BOARD (Soldered side view)

– Control Unit –

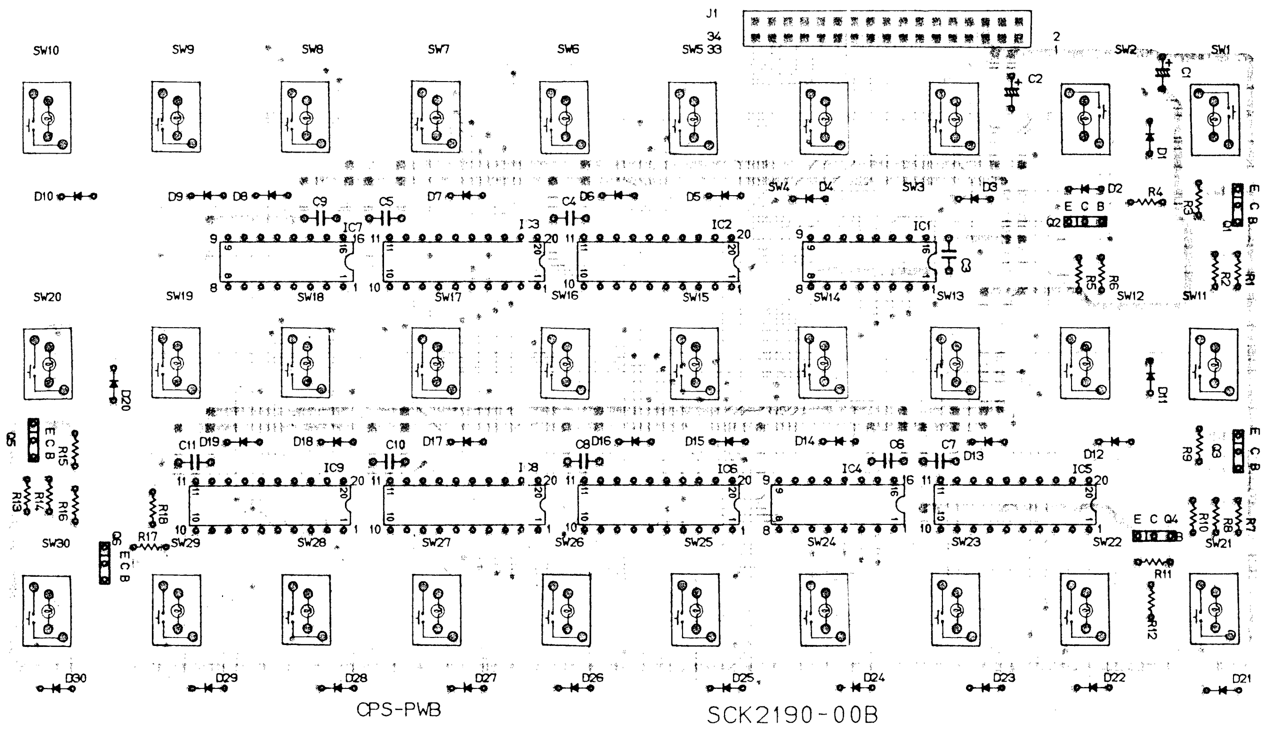
● CM board


CM-PWB
SCK2186-00B
IC3
IC2
IC1
DATAENTRY
MEMORY
COLORMATTE
HUE
EDITOR ENABLE
LED1
J10
J9
J8
J7
J6
J5
J4
ENTRY
EMEM
CMEM
LUM
CHR
BACKCOLOR
READ
STORE
INC
DEC
BORD
DSK
CN50
CN51
EFFECTSKEYER
GAIN
CLIP
KEYMASK
PSTPTN
KEY
EFFMATTE
SPOT
EXTKEY
KEYBUS
COLORKILL
CN2
COLOR BAR
SW18
DURAT
INV

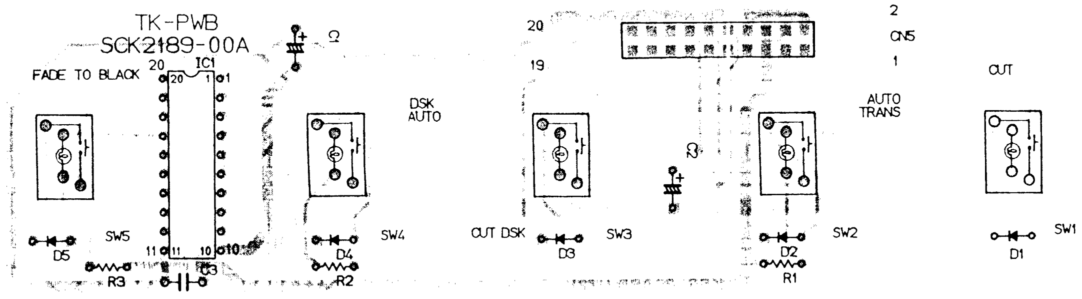
● WI boatd


SCK2187-00A
IC2
IC1
CN20
LED1
LED2
LED3
LED4
LED5
LED6
LED7
LED8
LED9
LED10
LED11
LED12
LED13
LED14
LED15
LED16
LED17
LED18
LED19
LED20
LED21
LED22
LED23
LED24

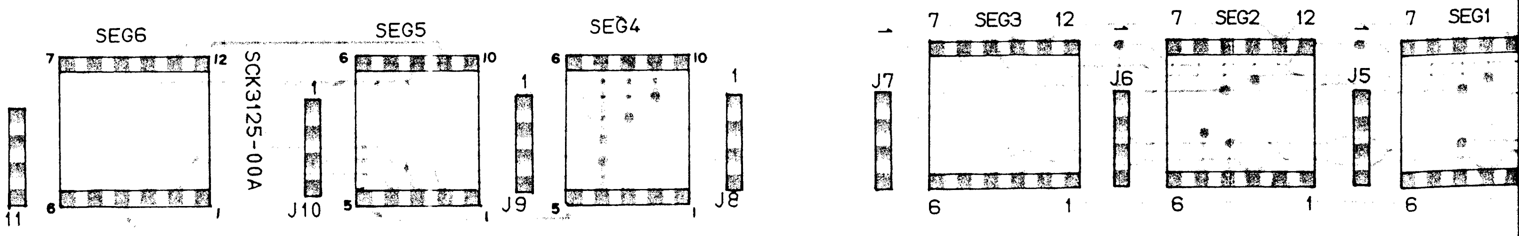
● CPS board


J1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
CPS-PWB
SCK2190-00B

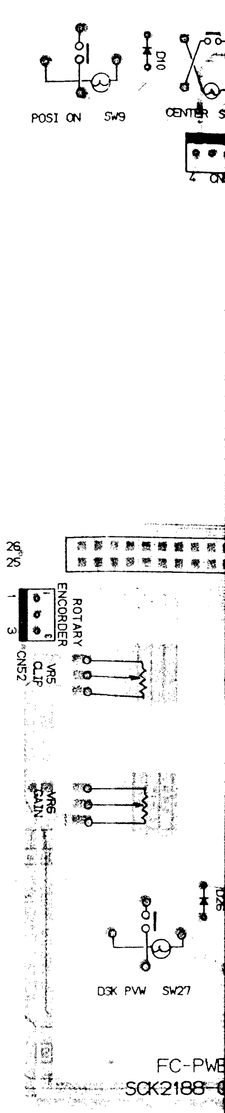
● TK board


TK-PWB
SCK2189-00A
IC1
FADE TO BLACK
DSK AUTO
CN5
AUTO TRANS
CUT
CUT DSK
SW1
SW2
SW3
SW4
SW5

● 7 SEGMENT LED board ass'y

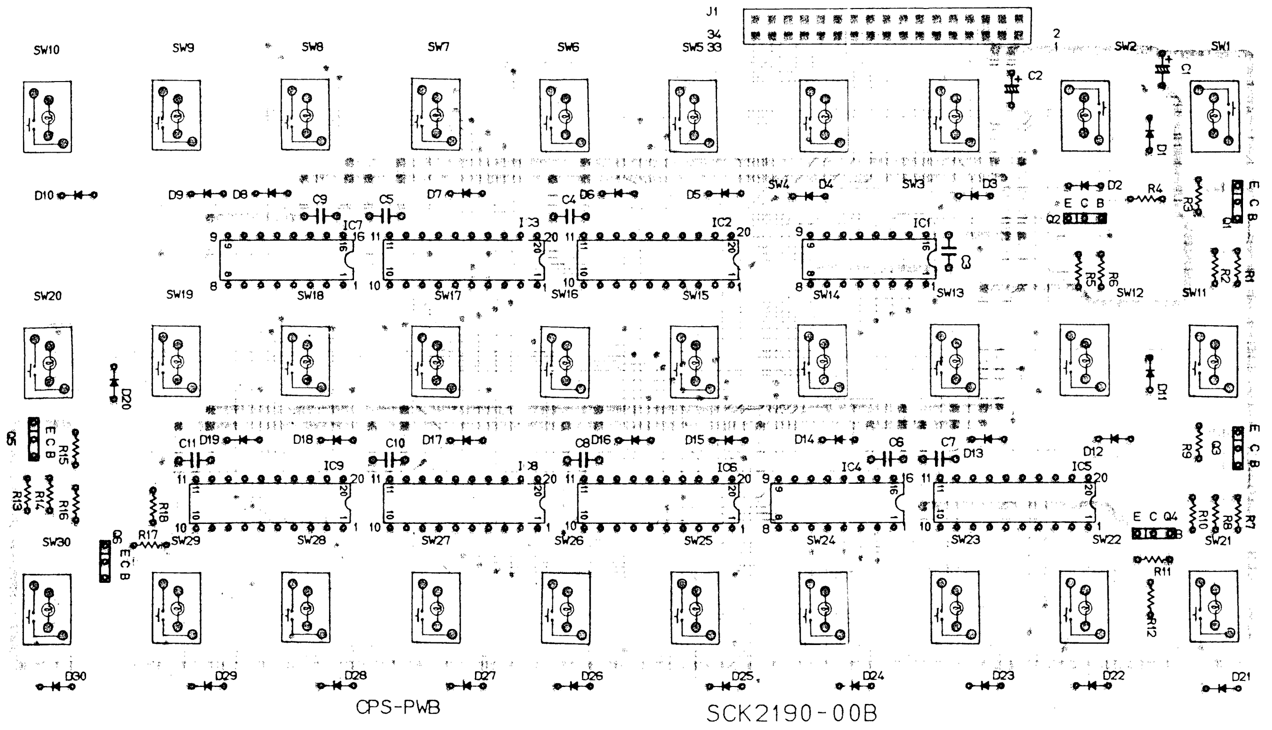

SEG6
SEG5
SEG4
SEG3
SEG2
SEG1
SCK3125-00A
J11
J10
J9
J8
J7
J6
J5

● FC board


POSI ON
SW9
ROTARY ENCODER
CN52
CLIP
GAIN
DSK PVW
SW27
FC-PWB
SCK2188

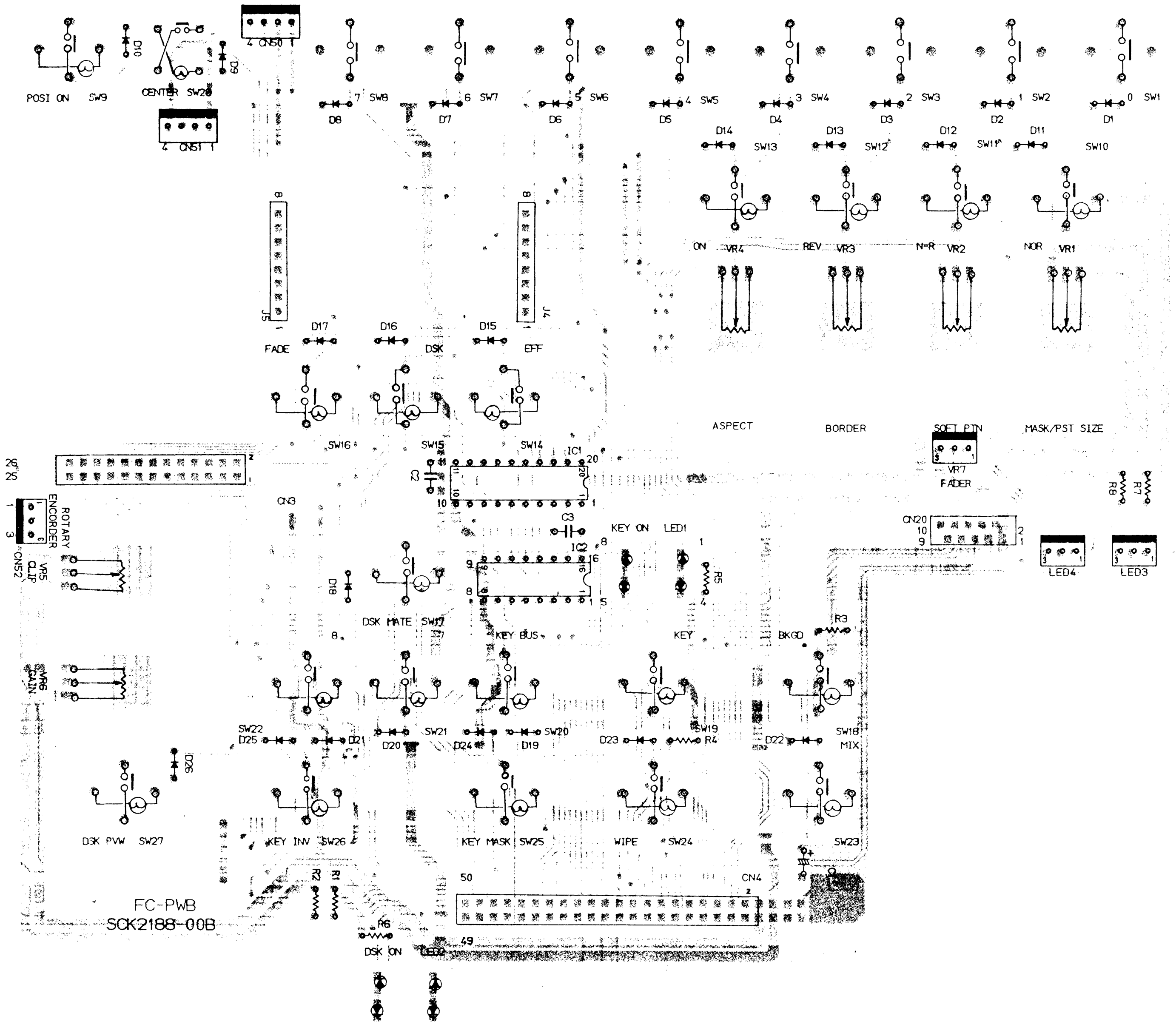
HUE
J4
LUM
OLOR BAR
D18
SW18
R2
R7
R8
E
C
B
Q2
LED9
LED17

● CPS board



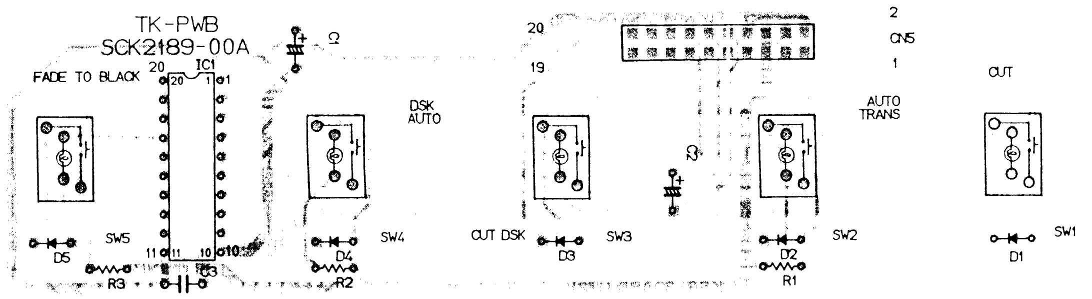
J1
34
33
2
1
SW10
SW9
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
SW11
SW12
SW13
SW14
SW15
SW16
SW17
SW18
SW19
SW20
SW21
SW22
SW23
SW24
SW25
SW26
SW27
SW28
SW29
SW30
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
Q1
Q2
Q3
Q4
Q5
Q6
E C B
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
D22
D23
D24
D25
D26
D27
D28
D29
D30
CPS-PWB
SCK2190-00B

● FC board



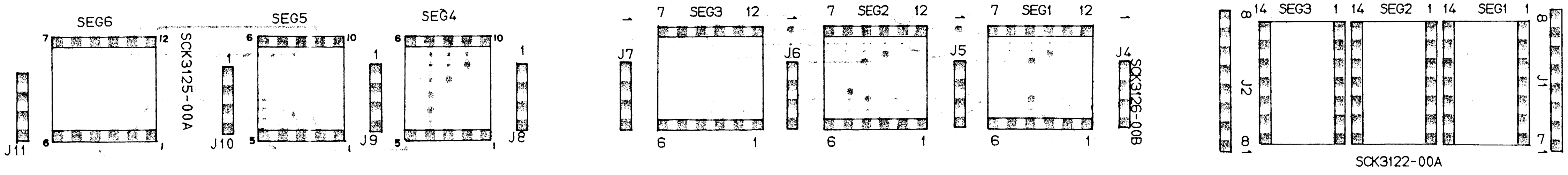
CN50
CN51
POSI ON
SW9
CENTER
SW28
D9
D10
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
D8
D7
D6
D5
D4
D3
D2
D1
D14
D13
D12
D11
SW13
SW12
SW11
SW10
ON
VR4
REV
VR3
N-R
VR2
NOR
VR1
J5
J4
FADE
D17
D16
DSK
D15
EFF
ASPECT
BORDER
SOFT PTN
MASK/PST SIZE
VR7
FADER
R8
R7
SW16
SW15
SW14
IC1
C3
C2
CN3
26
25
ROTARY ENCORDER
CN52
VR5 CLIP
VR6 GAIN
KEY ON
LED1
IC2
R5
CN20
LED4
LED3
D18
DSK MATE
SW17
KEY BUS
KEY
BKGD
R3
SW22
D25
D21
D20
SW21
D24
SW20
D19
D23
SW19
R4
D22
SW18
MIX
D26
DSK PVW
SW27
KEY INV
SW26
KEY MASK
SW25
WIPE
SW24
SW23
R2
R1
R6
CN4
50
49
DSK ON
LED2
FC-PWB
SCK2188-00B

● TK board



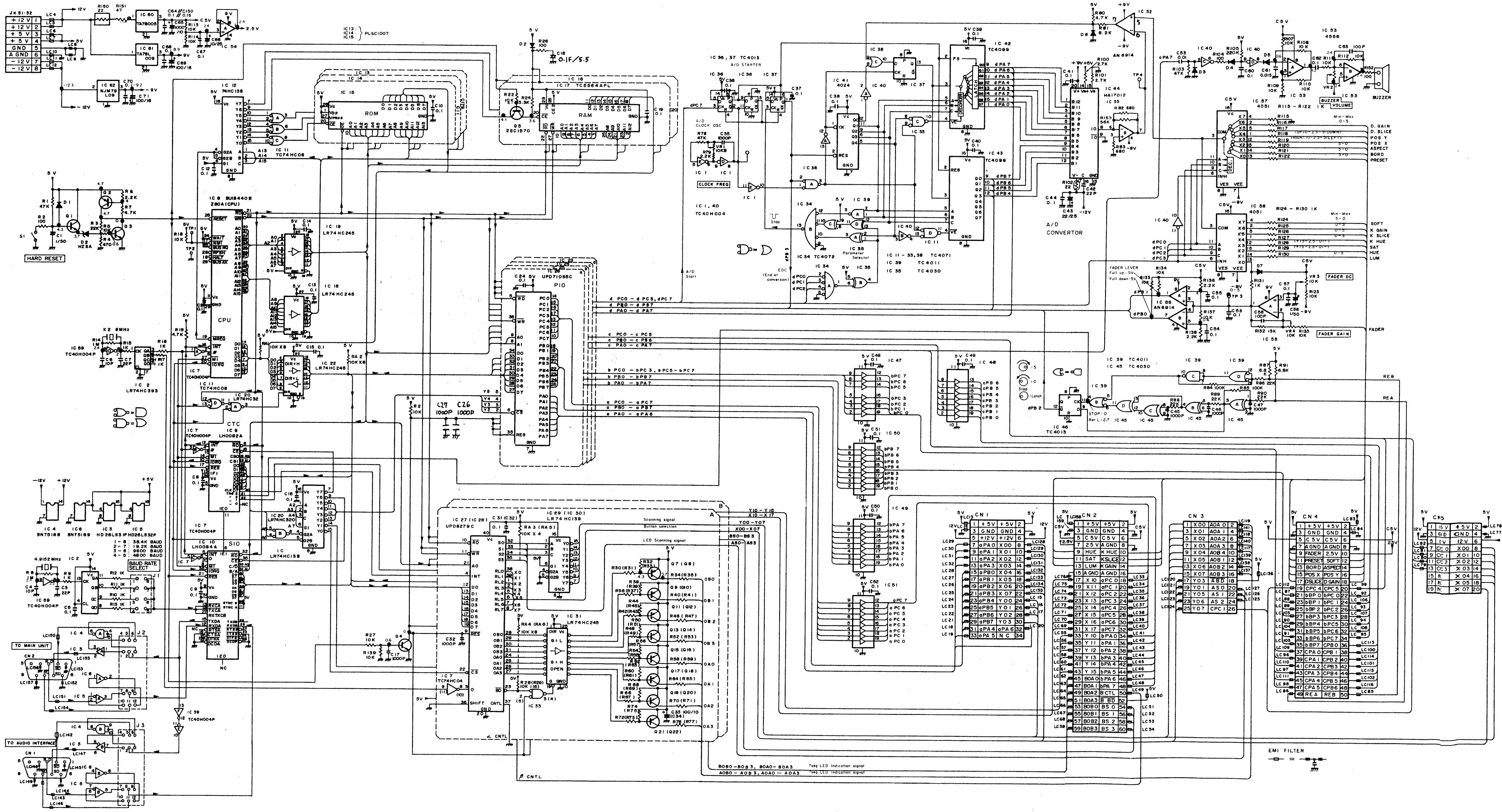
TK-PWB
SCK2189-00A
C1
C2
C3
IC1
20
10
11
FADE TO BLACK
DSK AUTO
AUTO TRANS
CUT
CN5
20
19
2
1
SW5
SW4
SW3
SW2
SW1
D5
D4
D3
D2
D1
R3
R2
R1
CUT DSK

● 7 SEGMENT LED board ass'y



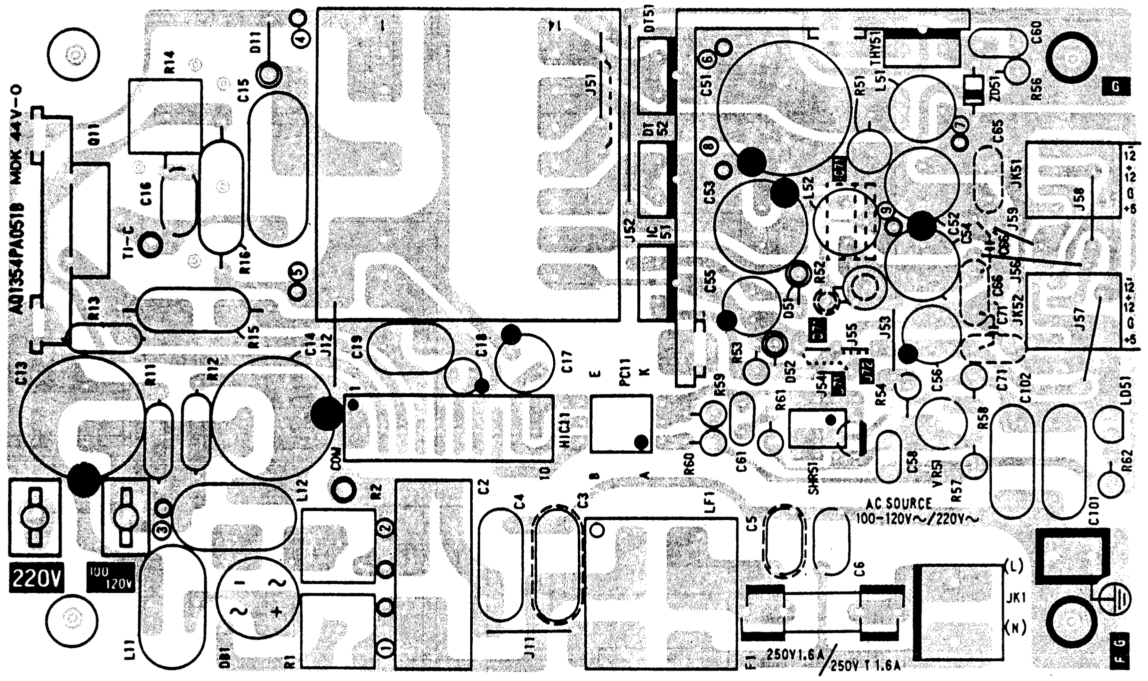
SEG6
SEG5
SEG4
SEG3
SEG2
SEG1
J11
J10
J9
J8
J7
J6
J5
J4
J2
J1
SCK3125-00A
SCK3126-00B
SCK3122-00A
7
12
6
1
5
10
14
8

6.6 DI BOARD SCHEMATIC DIAGRAM — Control Unit —

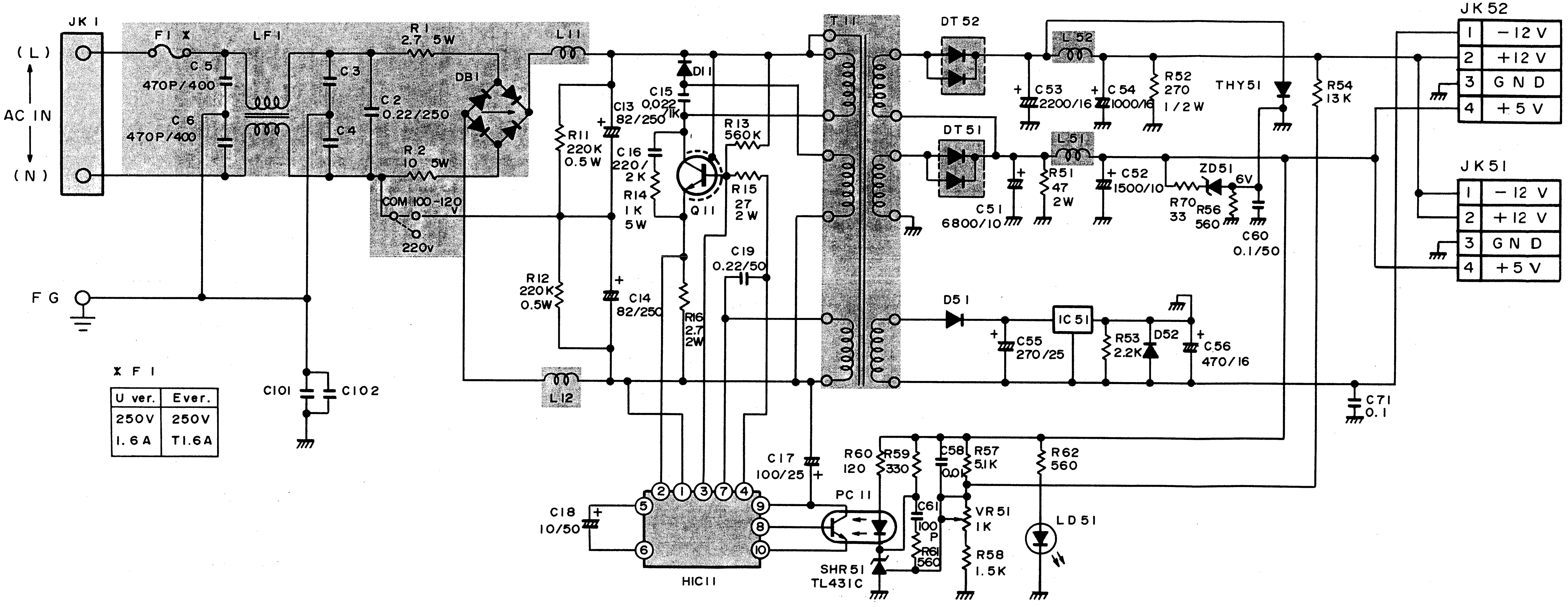


HARD RESET
TO MAIN UNIT
TO AUDIO INTERFACE
BAUD RATE SELECT
CPU
ROM
RAM
PIO
CTC
SIO
CLOCK FREQ
A/D CONVERTOR
BUZZER
VOLUME
FADER DC
FADER GAIN
FADER
Scanning signal
Button selection
LED Scanning signal
D. GAIN
D. SLICE
POS Y
POS X
ASPECT
BORD
PRESET
SOFT
K GAIN
K SLICE
K HUE
SAT
HUE
LUM
REB
REA
CN 1
CN 2
CN 3
CN 4
CN5
EMI FILTER

6.7 PS UNIT BOARD (Parts side view) — Control Unit —


A01354PA051B MDK 44V-0
220V
100 120V
AC SOURCE 100–120V~/220V~
250V1.6A/250V T 1.6A
JK1
(L)
(N)
F.G
G
HIC11
PC11
LF1
DB1
TI-C

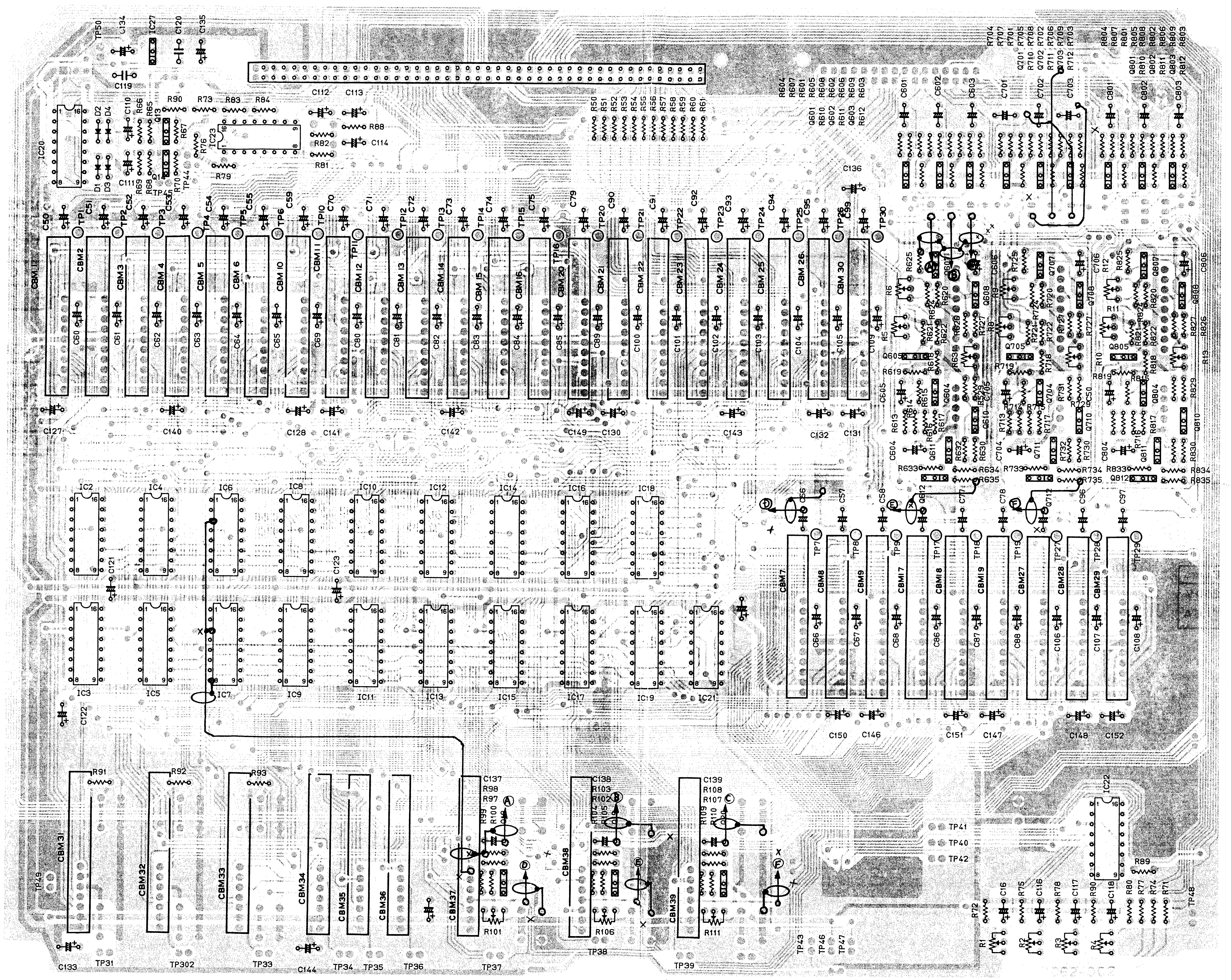
6.8 PS UNIT SCHEMATIC DIAGRAM — Control Unit —


JK 1
(L)
AC IN
(N)
F G
F1 ✗
C5
470P/400
C6
470P/400
LF1
C3
C4
R1
2.7 5W
C2
0.22/250
R2
10 5W
DB1
L11
L12
COM 100-120V
220v
C101
C102
R11
220K
0.5W
R12
220K
0.5W
C13
82/250
C14
82/250
C15
0.022
1K
C16
220/
2K
R14
1K
5W
D11
Q11
R13
560K
R15
27
2W
R16
2.7
2W
C19
0.22/50
C17
100/25
C18
10/50
HIC11
T11
DT52
DT51
D51
C53
2200/16
C54
1000/16
R52
270
1/2W
THY51
R54
13K
L52
L51
C51
6800/10
R51
47
2W
C52
1500/10
ZD51
6V
R70
33
R56
560
C60
0.1/50
IC51
C55
270/25
R53
2.2K
D52
C56
470/16
C71
0.1
R60
120
R59
330
C58
0.01
R57
5.1K
R62
560
PC11
C61
100P
R61
560
VR51
1K
R58
1.5K
LD51
SHR51
TL431C
JK52
JK51
1 −12 V
2 +12 V
3 GND
4 +5 V
1 −12 V
2 +12 V
3 GND
4 +5 V

✗ F1

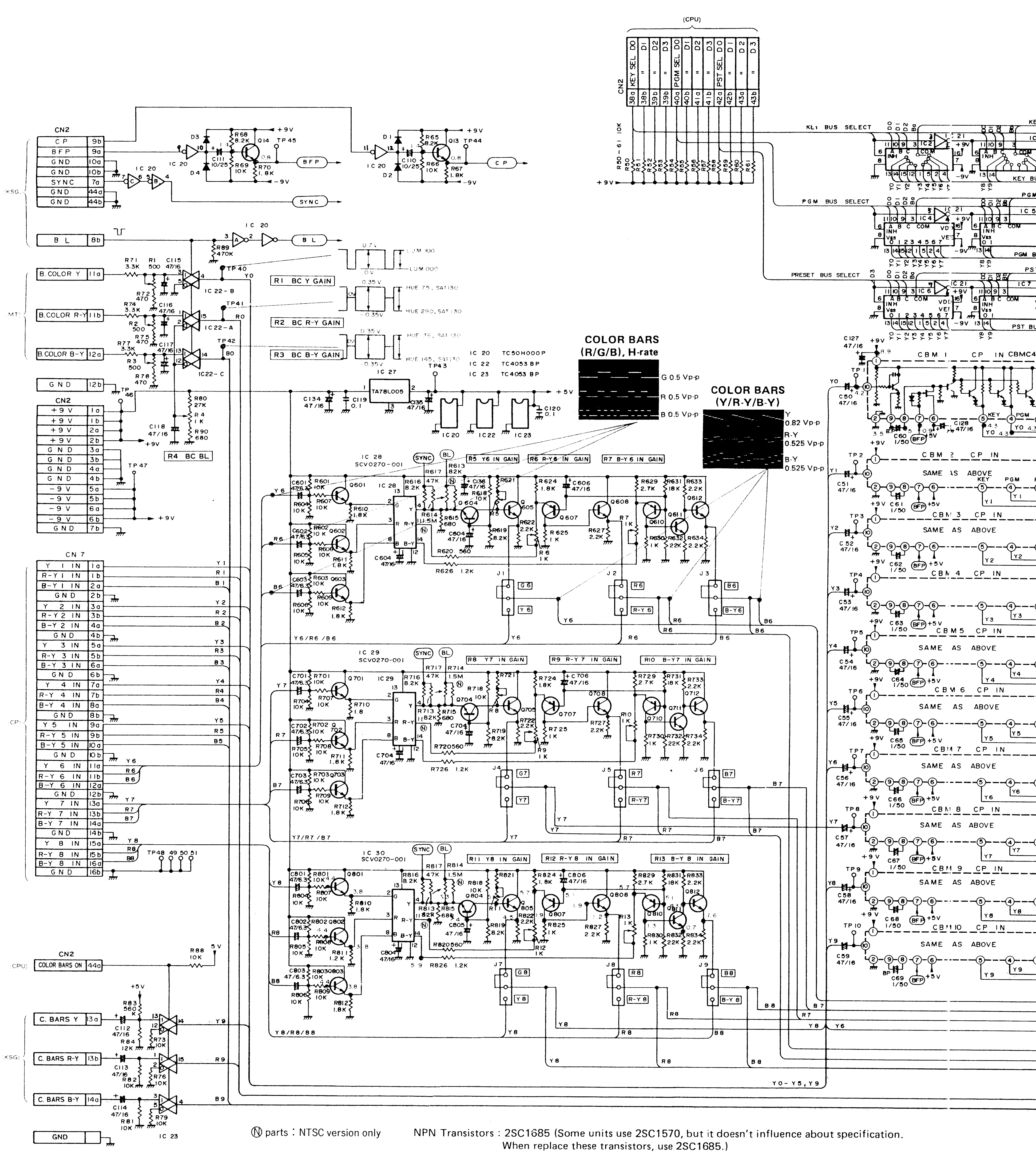
U ver.	E ver.
250V	250V
1.6A	T1.6A

6.9 CP CIRCUIT BOARD (Parts side view) – Main Unit –



IC20
IC23
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC21
IC22
IC27
CBM1
CBM2
CBM3
CBM4
CBM5
CBM6
CBM7
CBM8
CBM9
CBM10
CBM11
CBM12
CBM13
CBM14
CBM15
CBM16
CBM17
CBM18
CBM19
CBM20
CBM21
CBM22
CBM23
CBM24
CBM25
CBM26
CBM27
CBM28
CBM29
CBM30
CBM31
CBM32
CBM33
CBM34
CBM35
CBM36
CBM37
CBM38
CBM39
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
TP20
TP21
TP22
TP23
TP24
TP25
TP26
TP27
TP28
TP29
TP30
TP31
TP302
TP33
TP34
TP35
TP36
TP37
TP38
TP39
TP40
TP41
TP42
TP43
TP44
TP45
TP46
TP47
TP48
TP49
TP50
C112
C113
C114
C119
C120
C127
C128
C130
C131
C132
C133
C134
C135
C136
C140
C141
C142
C143
C144
C146
C147
C148
C149
C150
C151
C152
C137
C138
C139
R90
R73
R83
R84
R88
R82
R81
R79
R91
R92
R93
R97
R98
R99
R100
R101
R102
R103
R106
R107
R108
R109
R110
R111
R1
R2
R3
R4
R72
R75
R78
R80
R89
R90
R77
R74
R71
C16
C116
C117
C118
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R604
R607
R601
R605
R602
R606
R609
R603
R610
R608
R611
R612
Q601
Q602
Q603
C601
C602
C603
C701
C702
C703
C801
C802
C803
R704
R707
R701
R705
R702
R706
R709
R703
R710
R708
R711
R712
Q701
Q702
Q703
R804
R807
R801
R805
R802
R806
R809
R803
R810
R808
R811
R812
Q801
Q802
Q803
Q605
Q705
Q805
Q812
R633
R634
R635
R733
R734
R735
R833
R834
R835
C604
C704
C804
C605
C705
C806
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Ⓕ

6.10 CP BOARD SCHEMATIC DIAGRAM — Main Unit

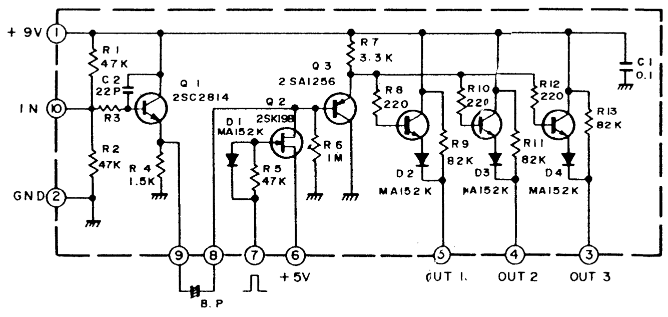

(CPU)
CN2
KEY SEL D0
PGM SEL D0
PST SEL D0
KL1 BUS SELECT
PGM BUS SELECT
PRESET BUS SELECT
(KSG)
(MT)
(CP)
(CPU)
CN2
CP
BFP
GND
SYNC
BL
B.COLOR Y
B.COLOR R-Y
B.COLOR B-Y
CN 7
Y 1 IN
R-Y 1 IN
B-Y 1 IN
COLOR BARS ON
C. BARS Y
C. BARS R-Y
C. BARS B-Y
R1 BC Y GAIN
R2 BC R-Y GAIN
R3 BC B-Y GAIN
R4 BC BL
IC 20 TC50H000P
IC 22 TC4053 BP
IC 23 TC4053 BP
IC 27 TA78L005
IC 28 SCV0270-001
IC 29 SCV0270-001
IC 30 SCV0270-001
R5 Y6 IN GAIN
R6 R-Y6 IN GAIN
R7 B-Y6 IN GAIN
R8 Y7 IN GAIN
R9 R-Y7 IN GAIN
R10 B-Y7 IN GAIN
R11 Y8 IN GAIN
R12 R-Y8 IN GAIN
R13 B-Y8 IN GAIN
COLOR BARS (R/G/B), H-rate
G 0.5 Vp-p
R 0.5 Vp-p
B 0.5 Vp-p
COLOR BARS (Y/R-Y/B-Y)
Y 0.82 Vp-p
R-Y 0.525 Vp-p
B-Y 0.525 Vp-p
CBM 1 CP IN CBMC4
CBM 2 CP IN
CBM 3 CP IN
CBM 4 CP IN
CBM 5 CP IN
CBM 6 CP IN
CBM 7 CP IN
CBM 8 CP IN
CBM 9 CP IN
CBM 10 CP IN
SAME AS ABOVE
Y0-Y5, Y9

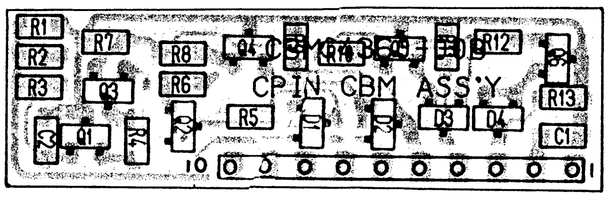
Ⓝ parts : NTSC version only

NPN Transistors : 2SC1685 (Some units use 2SC1570, but it doesn't influence about specification. When replace these transistors, use 2SC1685.)

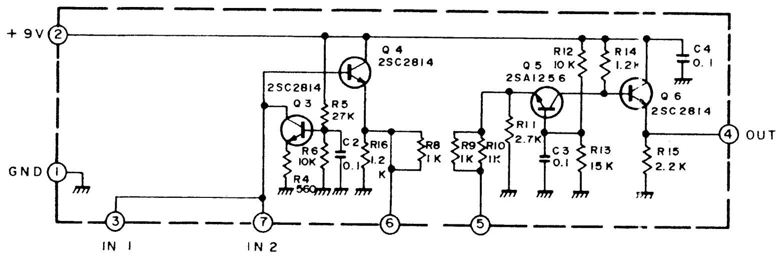
PNP Transistors : 2SA564

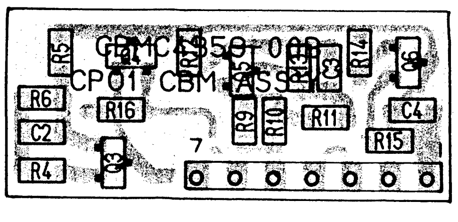
● CPIN CBM (CBMC4360-00B) (CBM1~CBM30)

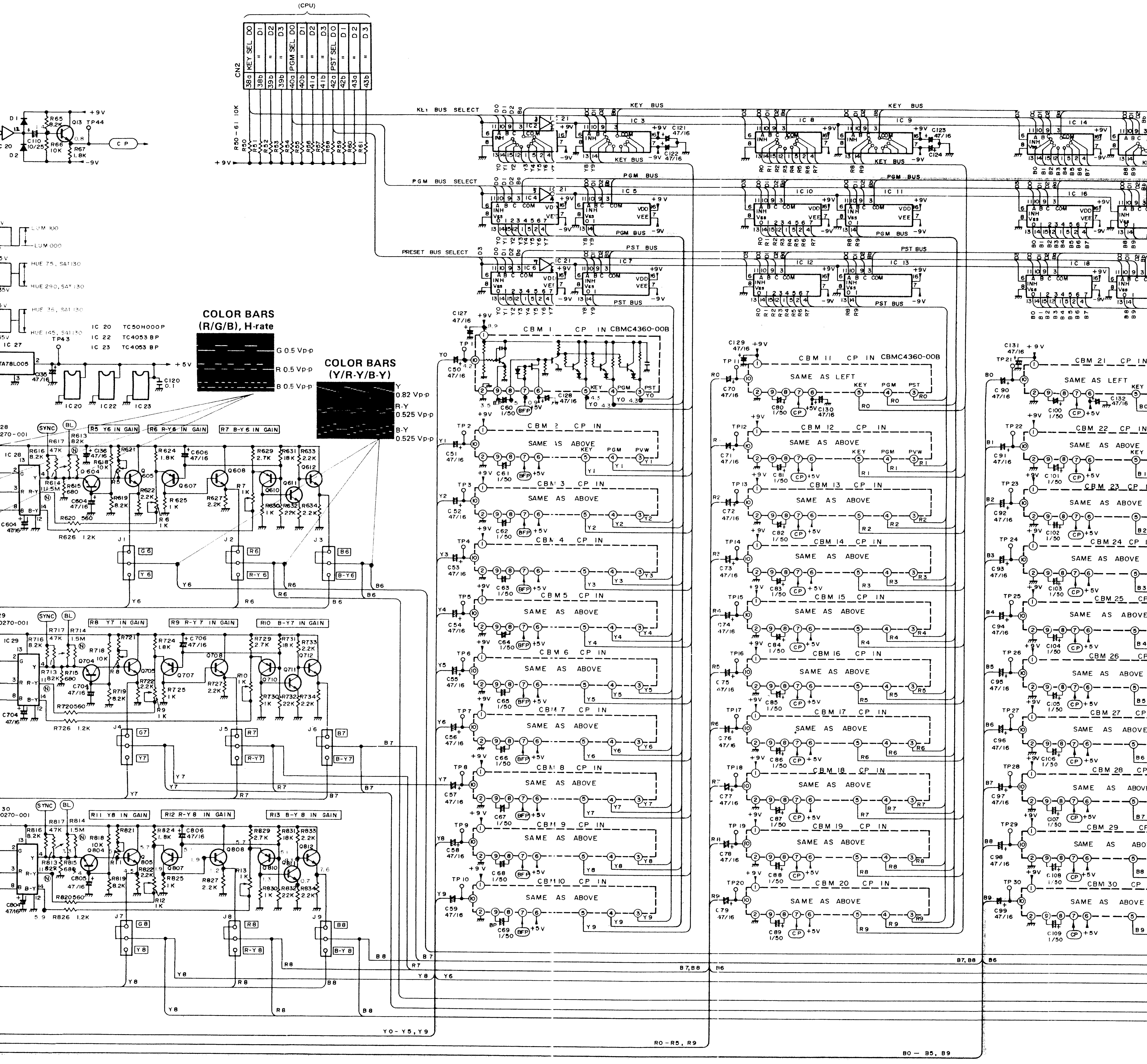

+9V
IN
GND
Q1 2SC2814
Q2 2SK198
Q3 2SA1256
D1 MA152K
D2 MA152K
D3 MA152K
D4 MA152K
B.P
+5V
OUT 1
OUT 2
OUT 3


CBMC4360-00B
CP IN CBM ASS'Y

● CP01 CBM (CBMC4359-00B) (CBM31/32/33)

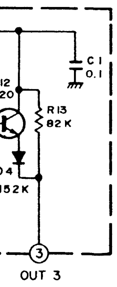

+9V
GND
Q3 2SC2814
Q4 2SC2814
Q5 2SA1256
Q6 2SC2814
OUT
IN 1
IN 2


CBMC4359-00B
CP01 CBM ASS'Y

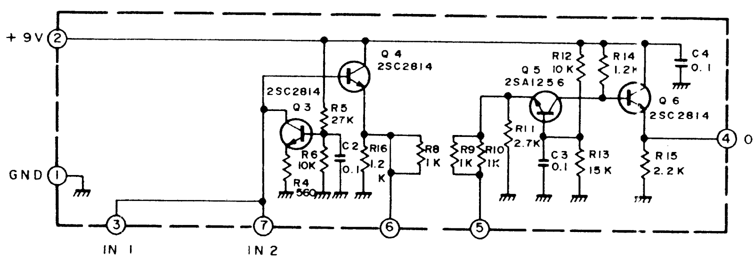

(CPU)
CN2
KEY SEL D0
PGM SEL D0
PST SEL D0
KL1 BUS SELECT
PGM BUS SELECT
PRESET BUS SELECT
KEY BUS
PGM BUS
PST BUS
IC 3
IC 5
IC 7
IC 8
IC 9
IC 10
IC 11
IC 12
IC 13
IC 14
IC 16
IC 18
IC 21
IC 20 TC50H000P
IC 22 TC4053BP
IC 23 TC4053BP
IC 27
TA78L005
COLOR BARS (R/G/B), H-rate
G 0.5 Vp-p
R 0.5 Vp-p
B 0.5 Vp-p
COLOR BARS (Y/R-Y/B-Y)
Y 0.82 Vp-p
R-Y 0.525 Vp-p
B-Y 0.525 Vp-p
CBM 1 CP IN CBMC4360-00B
CBM 11 CP IN CBMC4360-00B
CBM 21 CP IN
SAME AS ABOVE
SAME AS LEFT
KEY PGM PST
KEY PGM PVW
R5 Y6 IN GAIN
R6 R-Y6 IN GAIN
R7 B-Y6 IN GAIN
R8 Y7 IN GAIN
R9 R-Y7 IN GAIN
R10 B-Y7 IN GAIN
R11 Y8 IN GAIN
R12 R-Y8 IN GAIN
R13 B-Y8 IN GAIN
(SYNC) (BL)
Y0 - Y5, Y9
R0 - R5, R9
B0 - B5, B9
CP
+9V
-9V
+5V

ly NPN Transistors : 2SC1685 (Some units use 2SC1570, but it doesn't influence about specification.
When replace these transistors, use 2SC1685.)
PNP Transistors : 2SA564

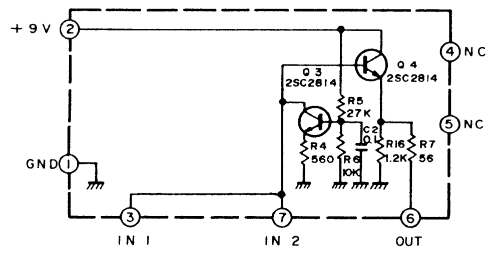
M1~CBM30)

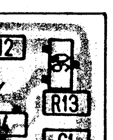

C1
0.1
R13
82K
OUT 3

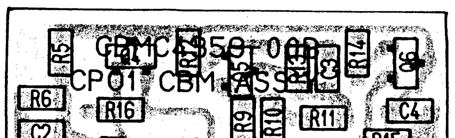
● CP01 CBM (CBMC4359-00B) (CBM31/32/33)

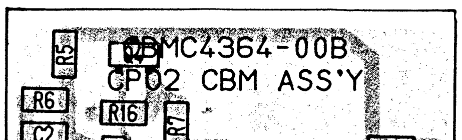

+9V
GND
Q4 2SC2814
Q3 2SC2814
Q5 2SA1256
Q6 2SC2814
R5 27K
R6 10K
R4 560
R12 10K
R14 1.2K
C4 0.1
R11 2.7K
R13 15K
R15 2.2K
C3 0.1
OUT
IN 1
IN 2

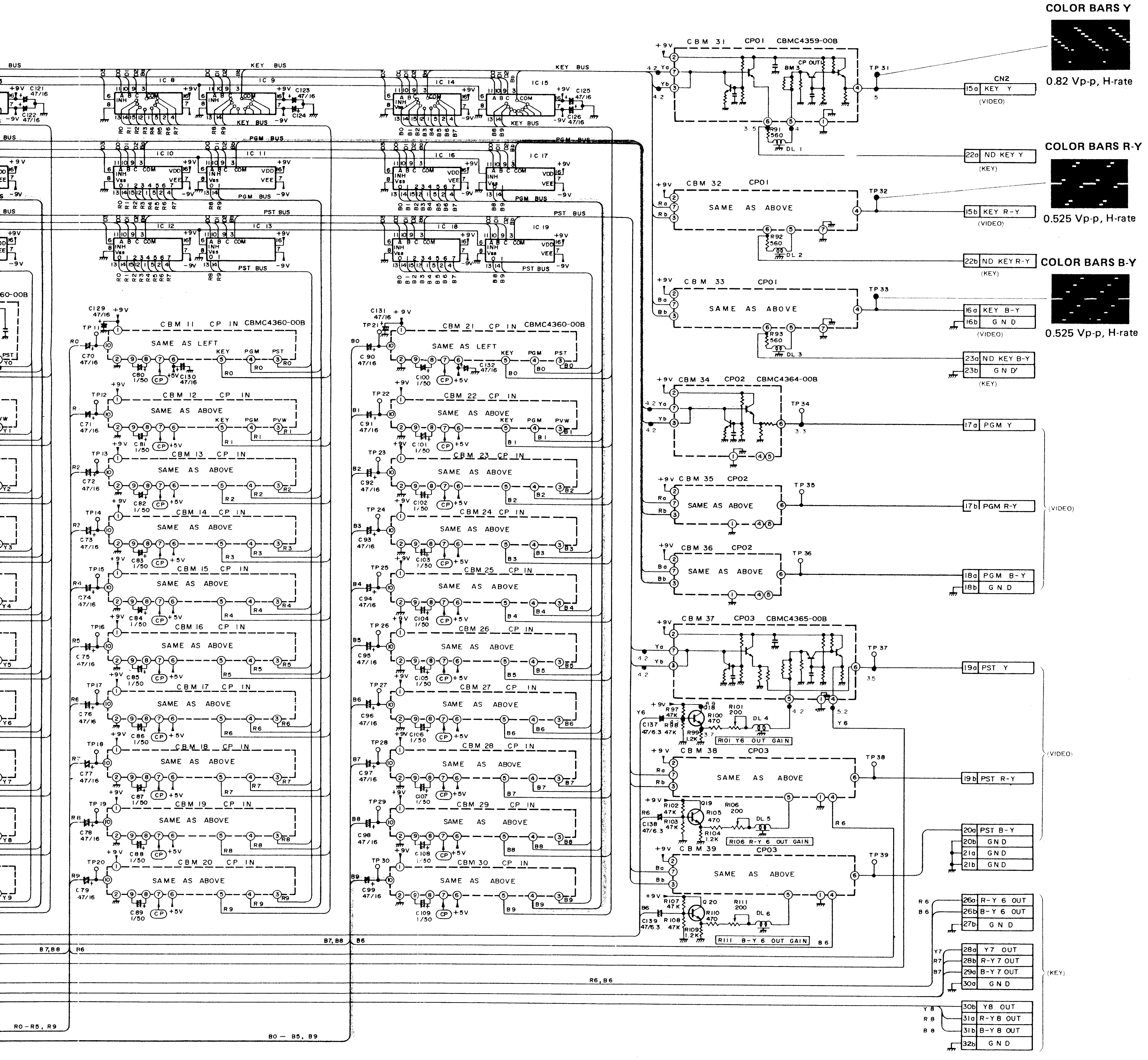
● CP02 CBM (CBMC4364-00B) (CBM34/35/36)


+9V
GND
Q3 2SC2814
Q4 2SC2814
R5 27K
R4 560
R6 10K
R16 1.2K
R7 56
NC
NC
IN 1
IN 2
OUT

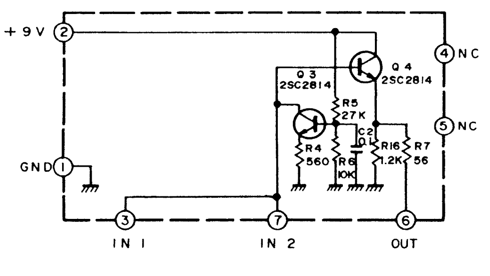



CBMC4359-00B
CP01 CBM ASS'Y
R5
R6
R16
C2
R4
R9
R10
R11
R14
C4
R15
Q6
7

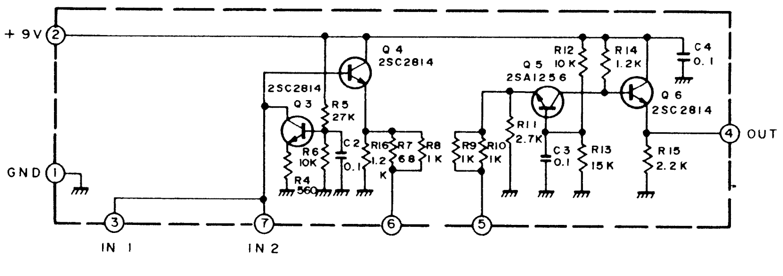

CBMC4364-00B
CP02 CBM ASS'Y
R5
R6
R16
R7
C2
R4
C4
7

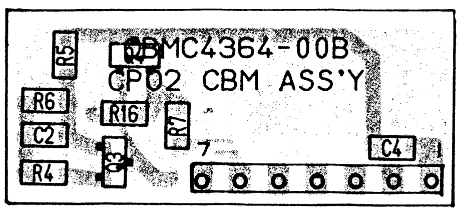

COLOR BARS Y
0.82 Vp-p, H-rate
COLOR BARS R-Y
0.525 Vp-p, H-rate
COLOR BARS B-Y
0.525 Vp-p, H-rate
CBM 31 CP01 CBMC4359-00B
CBM 32 CP01
CBM 33 CP01
CBM 34 CP02 CBMC4364-00B
CBM 35 CP02
CBM 36 CP02
CBM 37 CP03 CBMC4365-00B
CBM 38 CP03
CBM 39 CP03
CBM 11 CP IN CBMC4360-00B
CBM 21 CP IN CBMC4360-00B
SAME AS LEFT
SAME AS ABOVE
KEY BUS
PGM BUS
PST BUS
CN2
15a KEY Y
22a ND KEY Y
15b KEY R-Y
22b ND KEY R-Y
16a KEY B-Y
16b GND
23a ND KEY B-Y
23b GND
17a PGM Y
17b PGM R-Y
18a PGM B-Y
18b GND
19a PST Y
19b PST R-Y
20a PST B-Y
20b GND
21a GND
21b GND
26a R-Y 6 OUT
26b B-Y 6 OUT
27b GND
28a Y7 OUT
28b R-Y 7 OUT
29a B-Y 7 OUT
30a GND
30b Y8 OUT
31a R-Y 8 OUT
31b B-Y 8 OUT
32b GND
(VIDEO)
(KEY)
R101 Y6 OUT GAIN
R106 R-Y 6 OUT GAIN
R111 B-Y 6 OUT GAIN
R0 - R5, R9
B0 - B5, B9
R6, B6
B7, B8

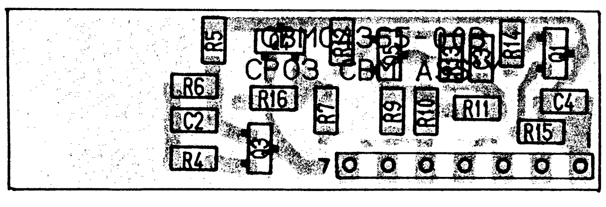
● CP02 CBM (CBMC4364-00B) (CBM34/35/36)


+9V
GND
IN 1
IN 2
OUT
NC
Q3 2SC2814
Q4 2SC2814
R5 27K
R4 560
R6 10K
R16 1.2K
R7 56
C2 0.1

● CP03 CBM (CBMC4365-00B) (CBM37/38/39)

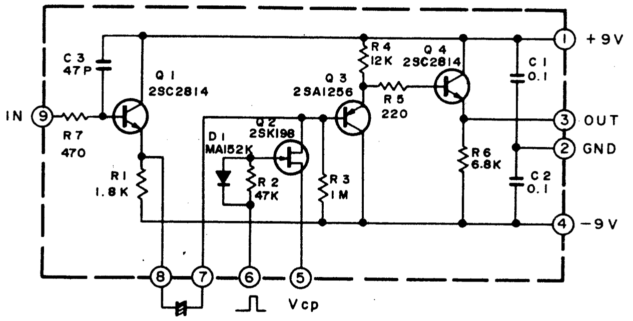

+9V
GND
IN 1
IN 2
OUT
Q3 2SC2814
Q4 2SC2814
Q5 2SA1256
Q6 2SC2814
R5 27K
R6 10K
R4 560
R16 1.2K
R8 68
R9 1K
R10 1K
R11 2.7K
R12 10K
R13 15K
R14 1.2K
R15 2.2K
C2 0.1
C3 0.1
C4 0.1

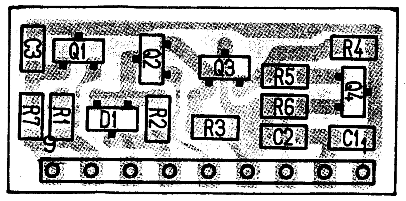

CBMC4364-00B
CP02 CBM ASS'Y


CBMC4365-00B
CP03 CBM ASS'Y

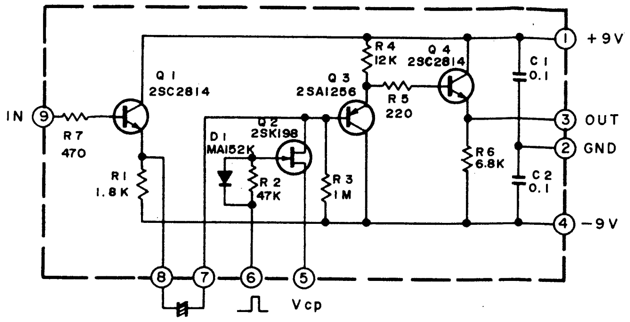
6.11 KEY BOARD CBM – Main Unit –

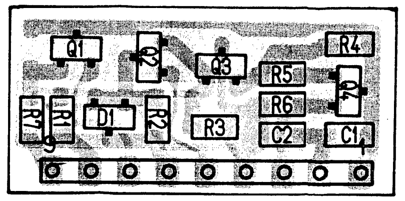
● CLAMP CBM (CBMC4353-00B) (CBM1/2/6/7/10/12/14/15/16)


+9V
C3
47P
Q1
2SC2814
R4
12K
Q4
2SC2814
Q3
2SA1256
C1
0.1
R5
220
IN
R7
470
Q2
2SK198
D1
MA152K
OUT
GND
R1
1.8K
R2
47K
R3
1M
R6
6.8K
C2
0.1
-9V
Vcp

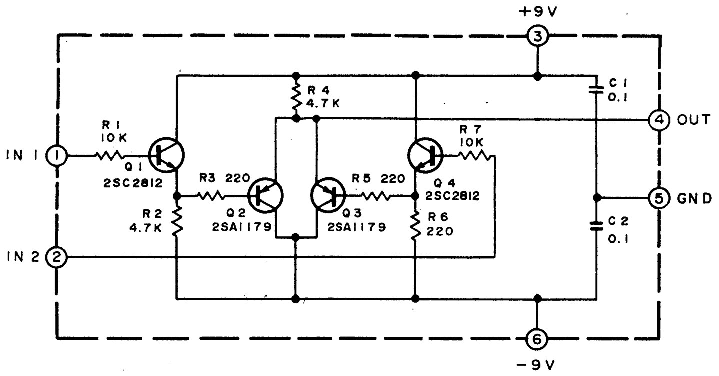

C3
Q1
Q2
Q3
R4
R5
Q4
R7
R1
D1
R2
R3
R6
C2
C1
9

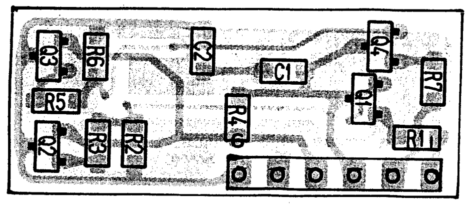
● CLAMP 2 CBM (CBMC4406-00A) (CBM3/4/5)


+9V
R4
12K
Q4
2SC2814
Q1
2SC2814
Q3
2SA1256
C1
0.1
R5
220
IN
R7
470
Q2
2SK198
D1
MA152K
OUT
GND
R1
1.8K
R2
47K
R3
1M
R6
6.8K
C2
0.1
-9V
Vcp

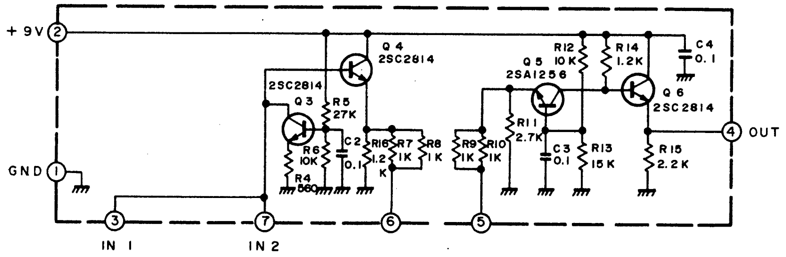

Q1
Q2
Q3
R4
R5
Q4
R7
R1
D1
R2
R3
R6
C2
C1
9

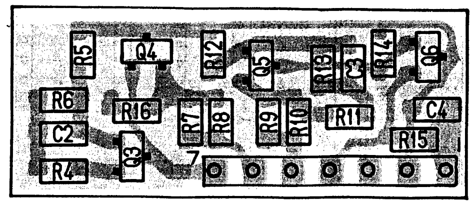
● MASK CBM (CBMC4393-00B) (CBM8/11/13)


+9V
C1
0.1
R4
4.7K
OUT
R1
10K
R7
10K
IN 1
Q1
2SC2812
R3 220
R5 220
Q4
2SC2812
GND
R2
4.7K
Q2
2SA1179
Q3
2SA1179
R6
220
C2
0.1
IN 2
-9V


R3
Q3
R6
C2
Q4
R7
C1
Q1
R5
R4
Q2
R2
R1

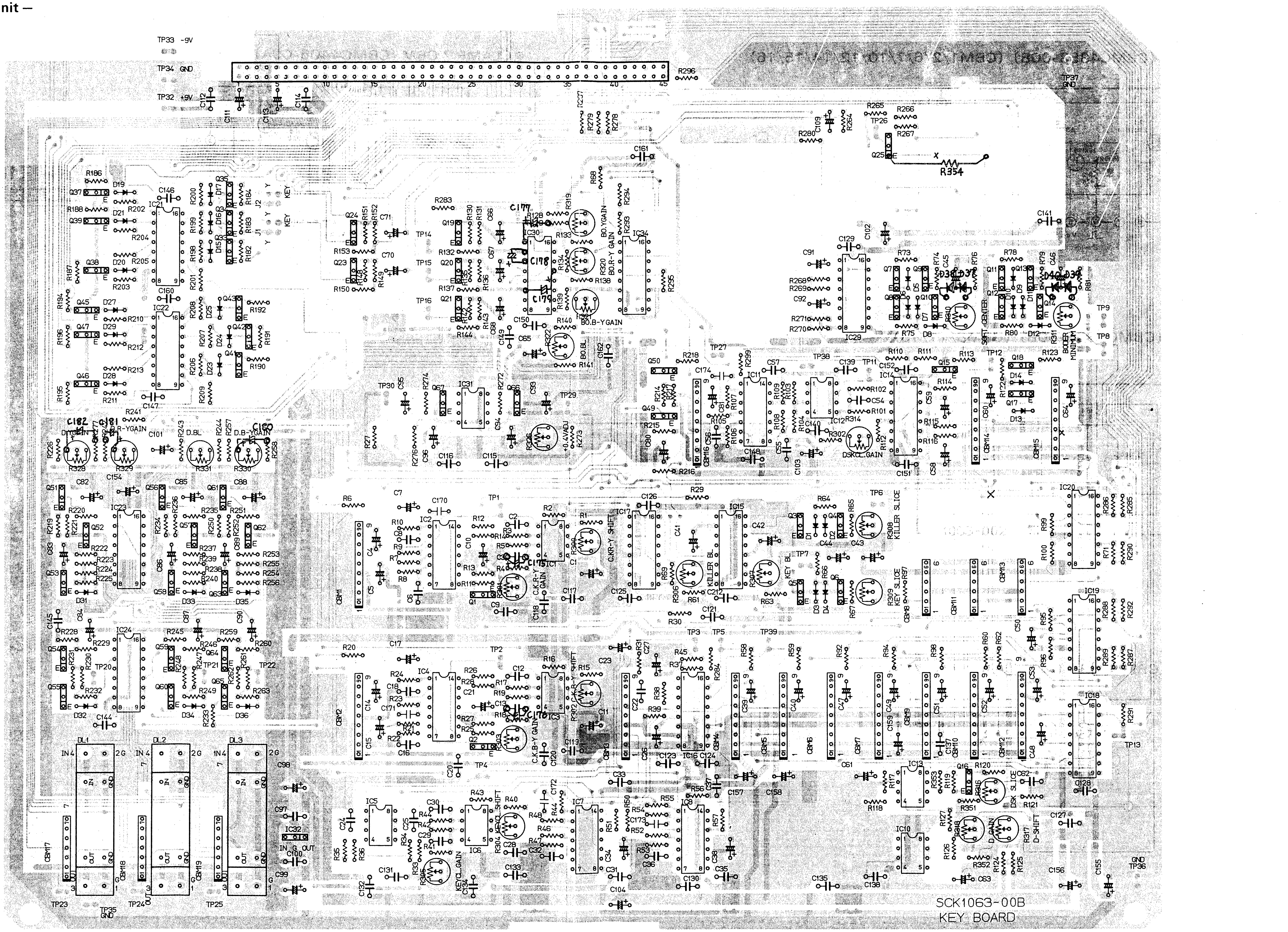
● CP04 CBM (CBMC4394-00B) (CBM17/18/19)


+9V
Q4
2SC2814
R12
10K
R14
1.2K
C4
0.1
Q5
2SA1256
2SC2814
Q3
R5
27K
Q6
2SC2814
R11
2.7K
OUT
C2
0.1
R16
1.2K
R7
1K
R8
1K
R9
1K
R10
1K
C3
0.1
R13
15K
R15
2.2K
GND
R6
10K
R4
560
IN 1
IN 2

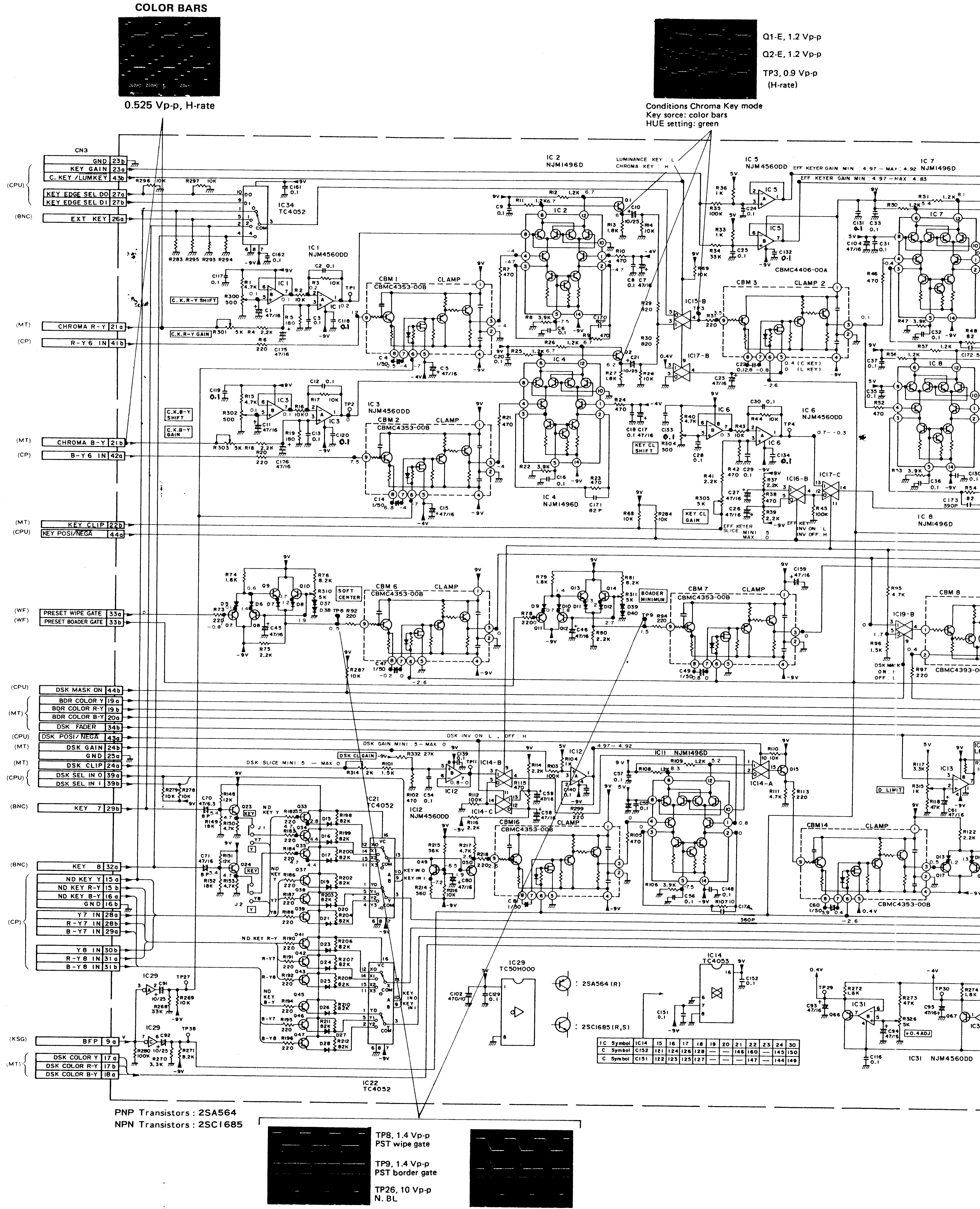

R5
Q4
R12
Q5
R13
C3
R14
Q6
R6
R16
R7
R8
R9
R10
R11
C4
C2
R15
R4
Q3
7

6.12 KEY CIRCUIT BOARD (Parts side view)

– Main Unit –


TP33 -9V
TP34 GND
TP32 +9V
TP37 GND
R296
R354
DY-GAIN
DR-YGAIN
D.BL
D.B-YGAIN
B0.YGAIN
B0.R-Y GAIN
B0.B-YGAIN
DSKCL.GAIN
C.K.R-Y GAIN
C.K.R-Y SHIFT
KILLER BL
KEY BL
KILLER SLICE
KEY SLICE
C.K.B-Y GAIN
C.K.B-Y SHIFT
KEYCL.GAIN
DSK SLICE
D.GAIN
D-SHIFT
SHIFT CENTER
BODER MINIMUM
DL1
DL2
DL3
IN
OUT
GND
TP23
TP24
TP25
TP35 GND
GND TP36
SCK1063-00B
KEY BOARD

6.13 KEY BOARD SCHEMATIC DIAGRAM — Main Unit



COLOR BARS
0.525 Vp-p, H-rate
Q1-E, 1.2 Vp-p
Q2-E, 1.2 Vp-p
TP3, 0.9 Vp-p
(H-rate)
Conditions Chroma Key mode
Key sorce: color bars
HUE setting: green
CN3
GND 23b
KEY GAIN 23a
C. KEY /LUMKEY 43b
KEY EDGE SEL D0 27a
KEY EDGE SEL D1 27b
EXT KEY 26a
CHROMA R-Y 21a
R-Y6 IN 41b
CHROMA B-Y 21b
B-Y6 IN 42a
KEY CLIP 22b
KEY POSI/NEGA 44a
PRESET WIPE GATE 33a
PRESET BOADER GATE 33b
DSK MASK ON 44b
BDR COLOR Y 19a
BDR COLOR R-Y 19b
BDR COLOR B-Y 20a
DSK FADER 34b
DSK POSI/NEGA 43a
DSK GAIN 24b
GND 25a
DSK CLIP 24a
DSK SEL IN 0 39a
DSK SEL IN 1 39b
KEY 7 29b
KEY 8 32a
ND KEY Y 15a
ND KEY R-Y 15b
ND KEY B-Y 16a
GND 16b
Y7 IN 28a
R-Y7 IN 28b
B-Y7 IN 29a
Y8 IN 30b
R-Y8 IN 31a
B-Y8 IN 31b
BFP 9a
DSK COLOR Y 17a
DSK COLOR R-Y 17b
DSK COLOR B-Y 18a
(CPU)
(BNC)
(MT)
(CP)
(WF)
(KSG)
IC34 TC4052
IC1 NJM4560DD
C.K.R-Y SHIFT
C.K.R-Y GAIN
CBM1 CBMC4353-00B
CLAMP
IC2 NJM1496D
LUMINANCE KEY : L
CHROMA KEY : H
IC4 NJM1496D
IC5 NJM4560DD
EFF KEYER GAIN MIN : 4.97 - MAX : 4.92
EFF KEYER GAIN MIN : 4.97 - MAX : 4.83
IC7 NJM1496D
CBMC4406-00A
CBM3
CLAMP 2
IC15-B
IC17-B
IC3 NJM4560DD
C.K.B-Y SHIFT
C.K.B-Y GAIN
CBM2 CBMC4353-00B
KEY CL SHIFT
KEY CL GAIN
IC6 NJM4560DD
IC16-B
IC17-C
EFF KEYER SLICE MINI : 5 MAX : 0
EFF KEY INV ON : L INV OFF : H
IC8 NJM1496D
SOFT CENTER
CBM6 CBMC4353-00B
BOADER MINIMUM
CBM7 CBMC4353-00B
CBM8
IC19-B
DSK MASK ON : H OFF : L
CBMC4393-0
DSK INV ON : L , OFF : H
DSK GAIN MINI : 5 - MAX : 0
DSK SLICE MINI : 5 - MAX : 0
DSK CL GAIN
IC12 NJM4560DD
IC14-B
IC14-C
CBM16 CBMC4353-00B
IC11 NJM1496D
IC14-A
IC13
D LIMIT
CBM14 CBMC4353-00B
IC21 TC4052
IC22 TC4052
IC29 TC50H000
IC14 TC4053
2SA564 (R)
2SC1685 (R,S)
IC31 NJM4560DD
+0.4ADJ
TP1
TP2
TP3
TP4
TP8
TP9
TP27
TP29
TP30
TP38

IC Symbol	IC14	15	16	17	18	19	20	21	22	23	24	30
C Symbol	C152	121	124	126	128	—	—	146	160	—	145	150
C Symbol	C151	122	123	125	127	—	—	—	147	—	144	149

PNP Transistors : 2SA564
NPN Transistors : 2SC1685

TP8, 1.4 Vp-p
PST wipe gate

TP9, 1.4 Vp-p
PST border gate

TP26, 10 Vp-p
N. BL

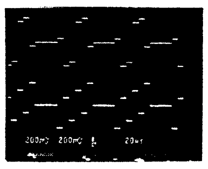
Conditions PST PTN mode
MASK/PST SIZE knob:Center
WIPE PATTERN: ▨

SOFT:OFF
BORDER:ON

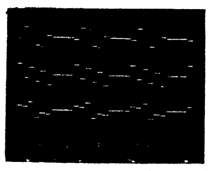
Conditions are same as left
without SOFT ON.

6.13 KEY BOARD SCHEMATIC DIAGRAM — Main Unit

COLOR BARS

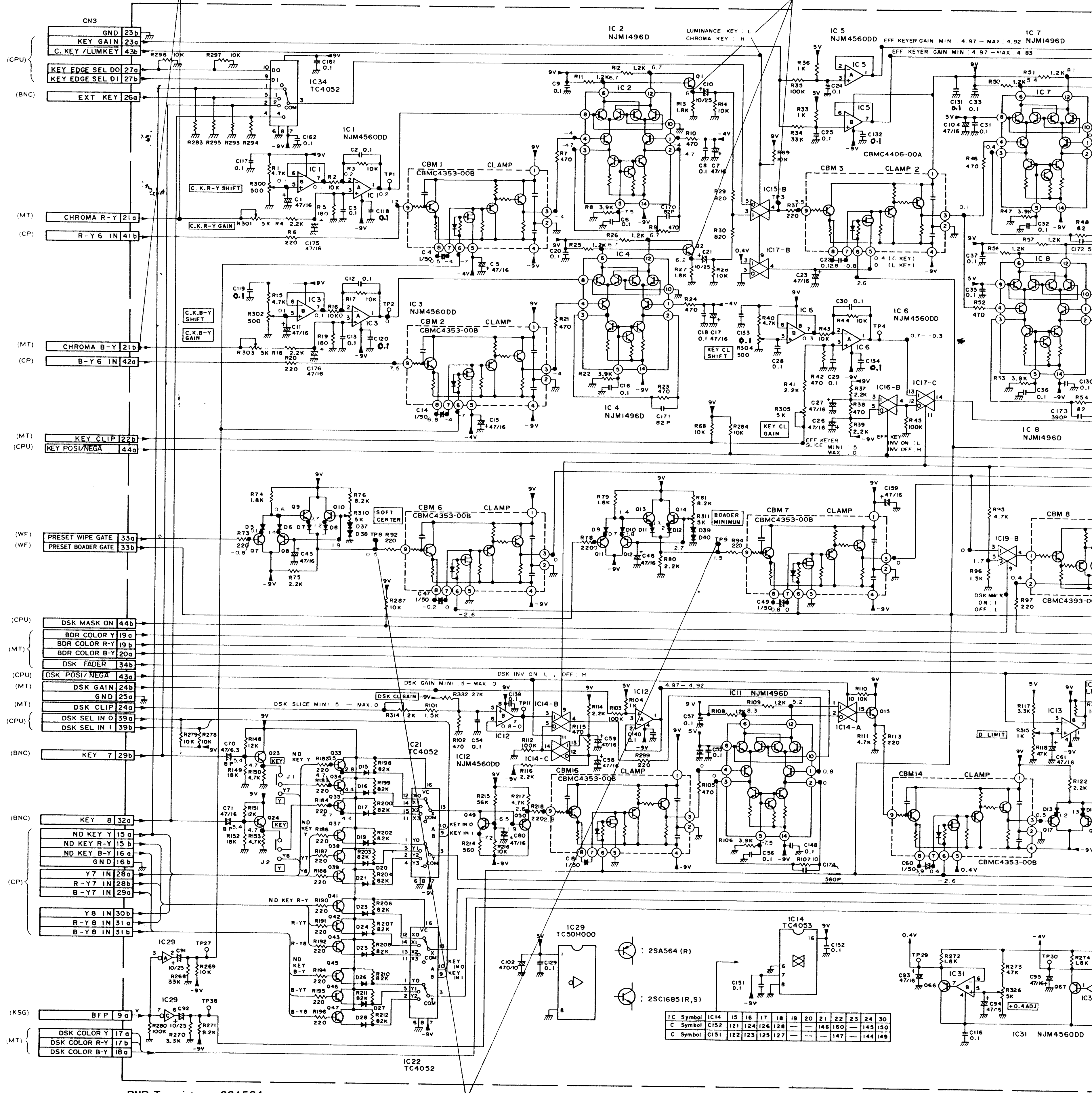


0.525 Vp-p, H-rate



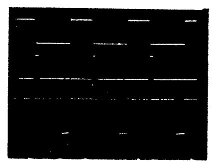
Q1-E, 1.2 Vp-p
Q2-E, 1.2 Vp-p
TP3, 0.9 Vp-p
(H-rate)

Conditions Chroma Key mode
Key sorce: color bars
HUE setting: green


CN3
(CPU)
GND 23b
KEY GAIN 23a
C. KEY /LUMKEY 43b
KEY EDGE SEL D0 27a
KEY EDGE SEL D1 27b
(BNC)
EXT KEY 26a
(MT)
CHROMA R-Y 21a
(CP)
R-Y6 IN 41b
CHROMA B-Y 21b
B-Y6 IN 42a
KEY CLIP 22b
KEY POSI/NEGA 44a
(WF)
PRESET WIPE GATE 33a
PRESET BOADER GATE 33b
DSK MASK ON 44b
BDR COLOR Y 19a
BDR COLOR R-Y 19b
BDR COLOR B-Y 20a
DSK FADER 34b
DSK POSI/NEGA 43a
DSK GAIN 24b
GND 25a
DSK CLIP 24a
DSK SEL IN 0 39a
DSK SEL IN 1 39b
KEY 7 29b
KEY 8 32a
ND KEY Y 15a
ND KEY R-Y 15b
ND KEY B-Y 16a
GND 16b
Y7 IN 28a
R-Y7 IN 28b
B-Y7 IN 29a
Y8 IN 30b
R-Y8 IN 31a
B-Y8 IN 31b
(KSG)
BFP 9a
DSK COLOR Y 17a
DSK COLOR R-Y 17b
DSK COLOR B-Y 18a
IC34 TC4052
IC1 NJM4560DD
IC2 NJM1496D
IC3 NJM4560DD
IC4 NJM1496D
IC5 NJM4560DD
IC6 NJM4560DD
IC7 NJM1496D
IC8 NJM1496D
IC11 NJM1496D
IC12 NJM4560DD
IC21 TC4052
IC22 TC4052
IC29 TC50H000
IC14 TC4053
IC31 NJM4560DD
CBM1 CBMC4353-00B
CBM2 CBMC4353-00B
CBM3 CBMC4406-00A
CBM6 CBMC4353-00B
CBM7 CBMC4353-00B
CBM14 CBMC4353-00B
CBM16 CBMC4353-00B
CLAMP
CLAMP 2
C.K.R-Y SHIFT
C.K.R-Y GAIN
C.K.B-Y SHIFT
C.K.B-Y GAIN
KEY CL SHIFT
KEY CL GAIN
SOFT CENTER
BOADER MINIMUM
DSK CL GAIN
D LIMIT
LUMINANCE KEY : L
CHROMA KEY : H
EFF KEYER GAIN MIN 4.97 — MAX 4.92
EFF KEYER SLICE MINI 5 MAX 0
DSK SLICE MINI 5 — MAX 0
DSK GAIN MINI 5 — MAX 0
DSK INV ON L, OFF H
DSK MASK ON H, OFF L
TP1
TP2
TP3
TP4
TP8
TP9
TP11
TP27
TP29
TP30
TP38
: 2SA564 (R)
: 2SC1685 (R,S)

IC Symbol	IC14	15	16	17	18	19	20	21	22	23	24	30
C Symbol	C152	121	124	126	128	—	—	146	160	—	145	150
C Symbol	C151	122	123	125	127	—	—	—	147	—	144	149

PNP Transistors : 2SA564
NPN Transistors : 2SC1685

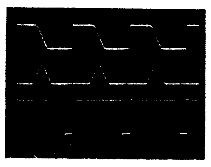


TP8, 1.4 Vp-p
PST wipe gate

TP9, 1.4 Vp-p
PST border gate

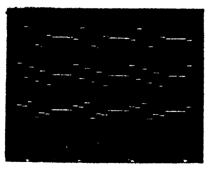
TP26, 10 Vp-p
N. BL

Conditions PST PTN mode
MASK/PST SIZE knob:Center
WIPE PATTERN: ▨
SOFT:OFF
BORDER:ON



Conditions are same as left
without SOFT ON.

AM – Main Unit

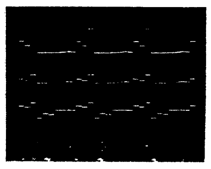


Q1-E, 1.2 Vp-p

Q2-E, 1.2 Vp-p

TP3, 0.9 Vp-p
(H-rate)

Conditions Chroma Key mode
Key sorce: color bars
HUE setting: green

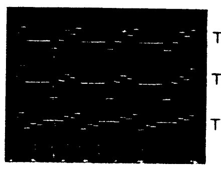


TP5, 1.4 Vp-p

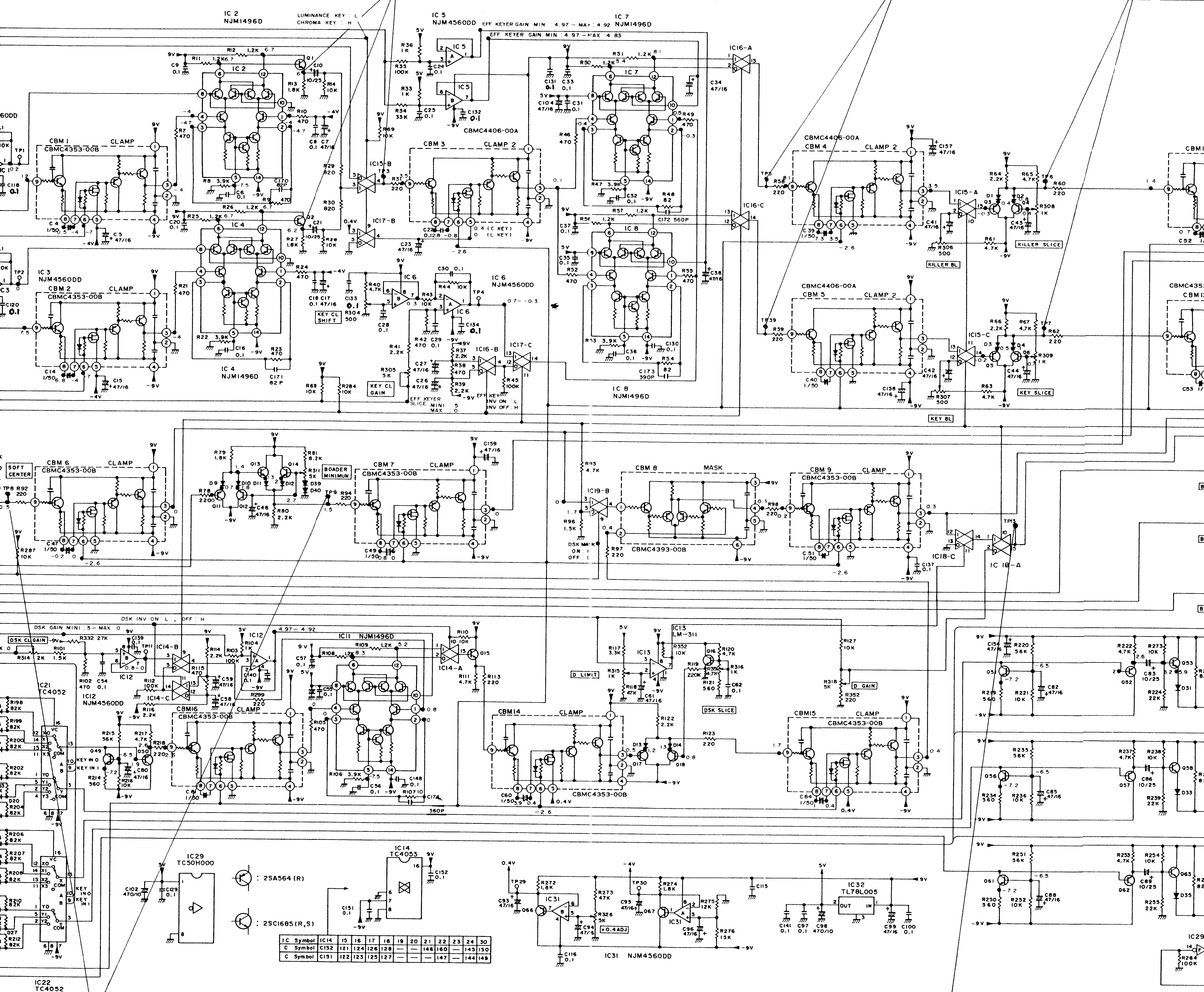
TP39, 0.8 Vp-p

TP3, 0.9 Vp-p
(H-rate)

Conditions are same as left



Conditions are same as left

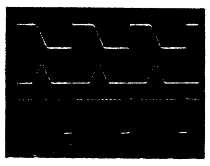

IC 2 NJM1496D
LUMINANCE KEY : L
CHROMA KEY : H
IC 5 NJM4560DD
EFF KEYER GAIN MIN : 4.97 – MAX : 4.92
IC 7 NJM1496D
EFF KEYER GAIN MIN : 4.97 – MAX : 4.83
CBM 1 CBMC4353-00B CLAMP
CBM 2 CBMC4353-00B CLAMP
CBM 3 CLAMP 2
CBMC4406-00A
IC 3 NJM4560DD
IC 4 NJM1496D
IC 6 NJM4560DD
IC 8 NJM1496D
KEY CL SHIFT
KEY CL GAIN
EFF KEYER SLICE MINI : 5 MAX : 0
EFF KEYER INV ON : L INV OFF : H
IC15-B
IC17-B
IC16-A
IC16-B
IC16-C
IC17-C
CBM 4 CBMC4406-00A CLAMP 2
CBM 5 CBMC4406-00A CLAMP 2
IC15-A
IC15-C
KILLER SLICE
KILLER BL
KEY SLICE
KEY BL
CBM 6 CBMC4353-00B CLAMP
SOFT CENTER
BOADER MINIMUM
CBM 7 CBMC4353-00B CLAMP
CBM 8 MASK CBMC4393-00B
CBM 9 CBMC4353-00B CLAMP
IC19-B
DSK MASK ON : L OFF : L
IC18-C
IC 18-A
DSK INV ON : L , OFF : H
DSK GAIN MINI : 5 – MAX : 0
DSK CL GAIN
IC12 NJM4560DD
IC14-B
IC14-C
IC14-A
IC11 NJM1496D
CBM16 CBMC4353-00B CLAMP
IC13 LM-311
D LIMIT
D GAIN
DSK SLICE
CBM14 CLAMP CBMC4353-00B
CBM15 CLAMP CBMC4353-00B
IC21 TC4052
IC22 TC4052
KEY IN 0
KEY IN 1
IC29 TC50H000
: 2SA564 (R)
: 2SC1685 (R, S)
IC14 TC4053
IC31 NJM4560DD
+0.4 ADJ
IC32 TL78L005
IC Symbol | IC14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 30
C Symbol | C152 | 121 | 124 | 126 | 128 | — | — | 146 | 160 | — | 143 | 150
C Symbol | C151 | 122 | 123 | 125 | 127 | — | — | — | 147 | — | 144 | 149

TP8, 1.4 Vp-p
PST wipe gate

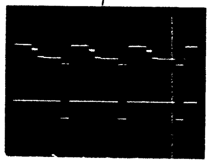
TP9, 1.4 Vp-p
PST border gate

TP26, 10 Vp-p
N. BL

TN mode
knob:Center
▨



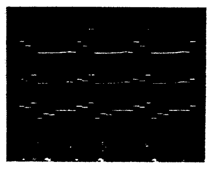
Conditions are same as left
without SOFT ON.



TP13, 1 Vp-p
DSK hole

TP26, 10 Vp-p
N.BL

Conditions DSK mode
DSK SLICE knob:Center
DSK GAINknob:Center
Key sorce:Color bors

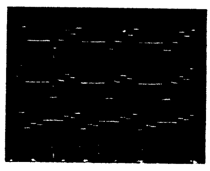


TP5, 1.4 Vp-p

TP39, 0.8 Vp-p

TP3, 0.9 Vp-p
(H-rate)

Conditions are same as left

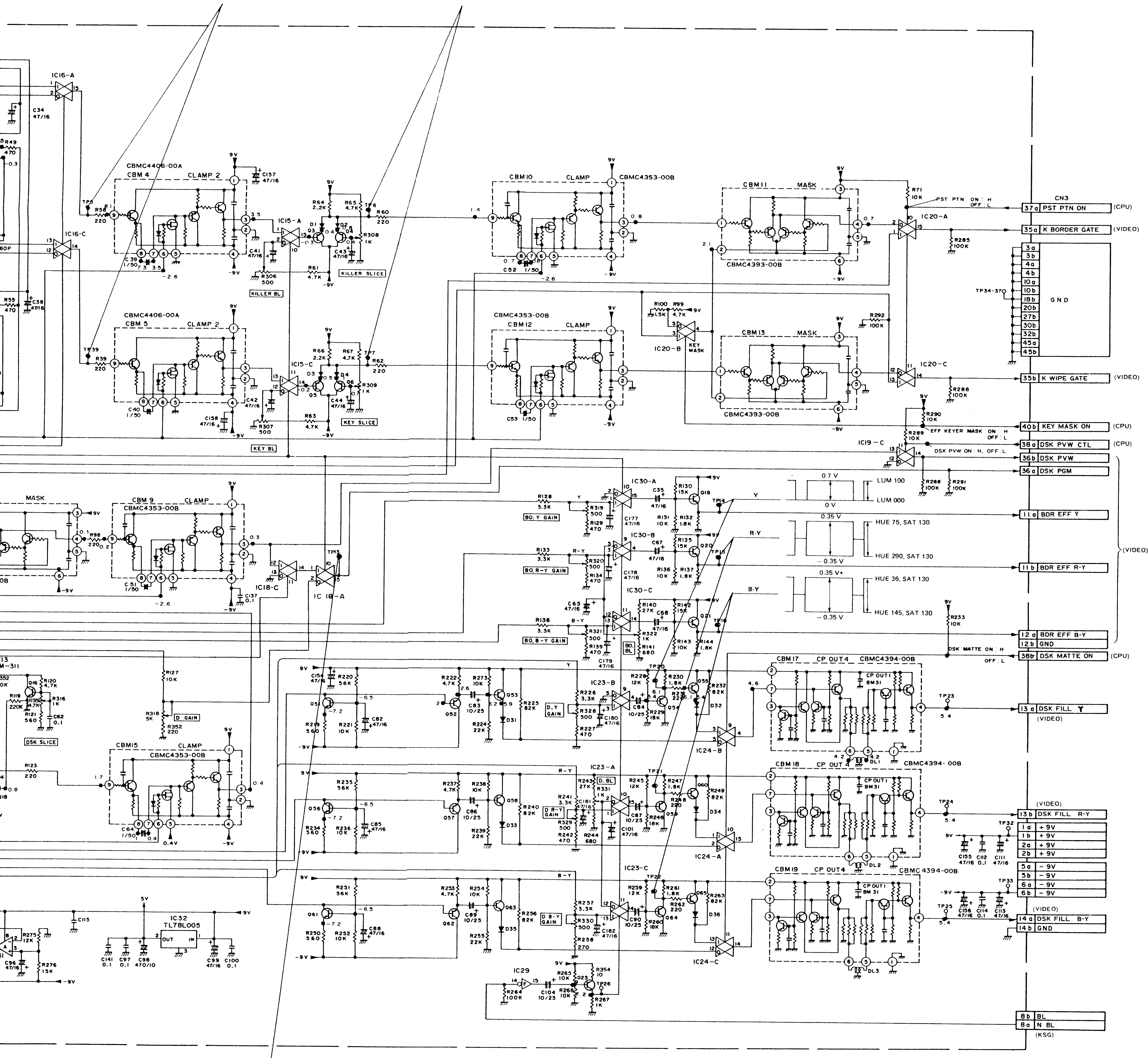


TP6, 1.1 Vp-p

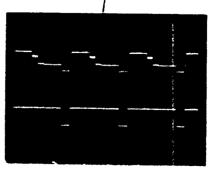
TP7, 0.7 Vp-p

TP3, 0.9 Vp-p
(H-rate)

Conditions are same as left



IC16-A
IC16-C
CBMC4406-00A
CBM 4 CLAMP 2
CBM 5 CLAMP 2
IC15-A
IC15-C
KILLER SLICE
KILLER BL
KEY SLICE
KEY BL
CBM10 CLAMP CBMC4353-00B
CBM12 CLAMP
CBMC4353-00B
CBM11 MASK
CBM13 MASK
CBMC4393-00B
IC20-A
IC20-B
IC20-C
KEY MASK
PST PTN ON : H OFF : L
EFF KEYER MASK ON : H OFF : L
DSK PVW ON : H, OFF : L
IC19-C
CN3
37a PST PTN ON (CPU)
35a K BORDER GATE (VIDEO)
3a 3b 4a 4b 10a 10b 18b 20b 27b 30b 32b 45a 45b GND
TP34-37
35b K WIPE GATE (VIDEO)
40b KEY MASK ON (CPU)
38a DSK PVW CTL (CPU)
36b DSK PVW
36a DSK PGM
MASK
CBM 9 CLAMP
CBMC4353-00B
IC18-C
IC 18-A
TP13
IC30-A
IC30-B
IC30-C
BO. Y GAIN
BO. R-Y GAIN
BO. B-Y GAIN
BO. BL
0.7 V
0 V
LUM 100
LUM 000
0.35 V
HUE 75, SAT 130
HUE 290, SAT 130
- 0.35 V
0.35 V+
HUE 36, SAT 130
HUE 145, SAT 130
11a BDR EFF Y
11b BDR EFF R-Y
(VIDEO)
12a BDR EFF B-Y
12b GND
DSK MATTE ON : H OFF : L
36b DSK MATTE ON (CPU)
CBM17 CP OUT4 CBMC4394-00B
CBM 18 CP OUT 4 CBMC4394-00B
CBM19 CP OUT4 CBMC 4394-00B
CP OUT1 BM31
IC23-A
IC23-B
IC23-C
IC24-A
IC24-B
IC24-C
D. GAIN
DSK SLICE
D.Y GAIN
D.R-Y GAIN
D.B-Y GAIN
D. BL
CBM15 CLAMP
CBMC4353-00B
13a DSK FILL Y (VIDEO)
13b DSK FILL R-Y
1a 1b 2a 2b +9V
5a 5b 6a 6b -9V
14a DSK FILL B-Y
14b GND
IC32 TL78L005
IC29
TP26
8b BL
8a N BL
(KSG)



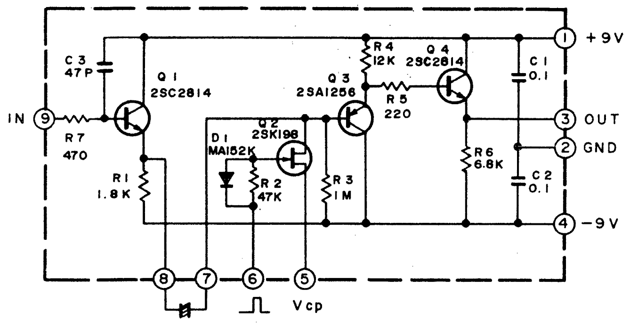
TP13, 1 Vp-p
DSK hole

TP26, 10 Vp-p
N.BL

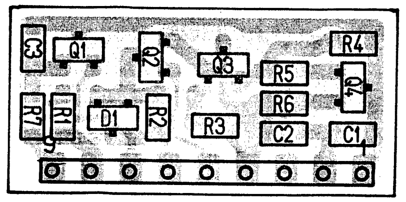
Conditions DSK mode
DSK SLICE knob:Center
DSK GAINknob:Center
Key sorce:Color bors

6.14 WF BOARD CBM — Main Unit —

● CLAMP CBM (CBMC4353-00B) (CBM17~24)

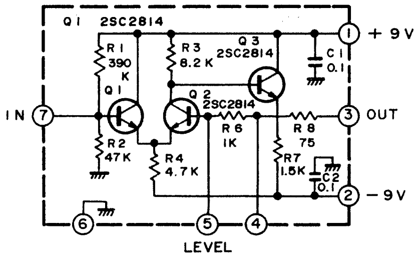


+9V
C3 47P
Q1 2SC2814
R4 12K
Q4 2SC2814
C1 0.1
Q3 2SA1256
R5 220
IN
R7 470
D1 MA152K
Q2 2SK198
OUT
GND
R6 6.8K
R1 1.8K
R2 47K
R3 1M
C2 0.1
-9V
Vcp

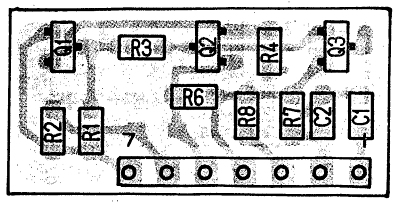


C3
Q1
Q2
Q3
R5
R4
R7
R1
D1
R2
R6
Q4
R3
C2
C1
9

● VIDEO CBM (CBMC4355-00A) (CBM35)

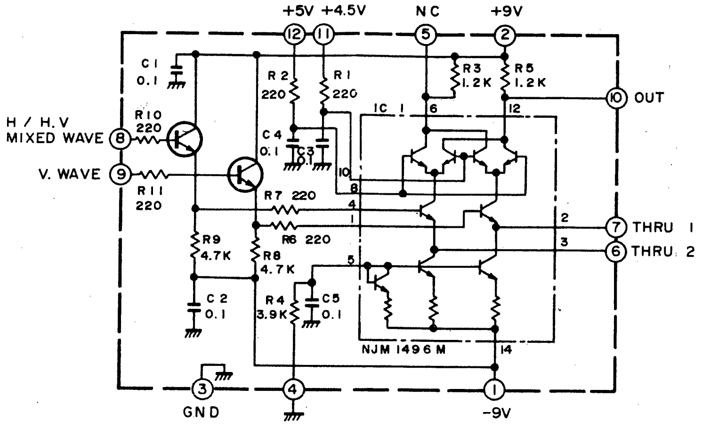


Q1 2SC2814
R1 390 K
R3 8.2K
Q3 2SC2814
C1 0.1
+9V
IN
Q2 2SC2814
R6 1K
R8 75
OUT
R2 47K
R4 4.7K
R7 1.5K
C2 0.1
-9V
LEVEL

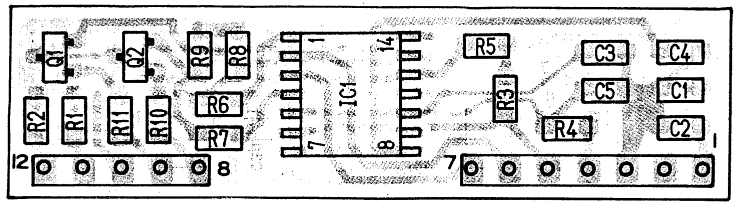


Q1
R3
Q2
R4
Q3
R6
R2
R1
R8
R7
C2
C1
7

● COMPA CBM (CBMC4351-00B) (CBM9~16)

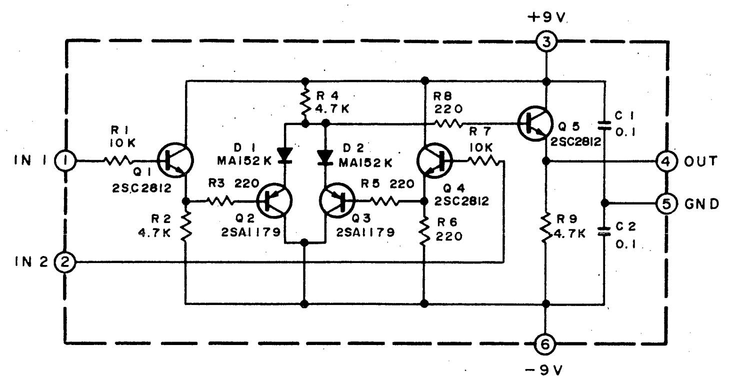


+5V
+4.5V
NC
+9V
C1 0.1
R2 220
R1 220
R3 1.2K
R5 1.2K
OUT
IC 1
H / H.V MIXED WAVE
R10 220
C4 0.1
C3
V. WAVE
R11 220
R7 220
R6 220
THRU 1
THRU 2
R9 4.7K
R8 4.7K
C2 0.1
R4 3.9K
C5 0.1
NJM 1496 M
GND
-9V

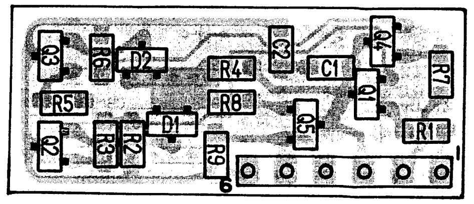


Q1
Q2
R9
R8
IC1
R5
C3
C4
C5
C1
R3
R2
R1
R11
R10
R6
R7
R4
C2
12
8
7
1
14

● AND CBM (CBMC4354-00B) (CBM25/26/27/30)

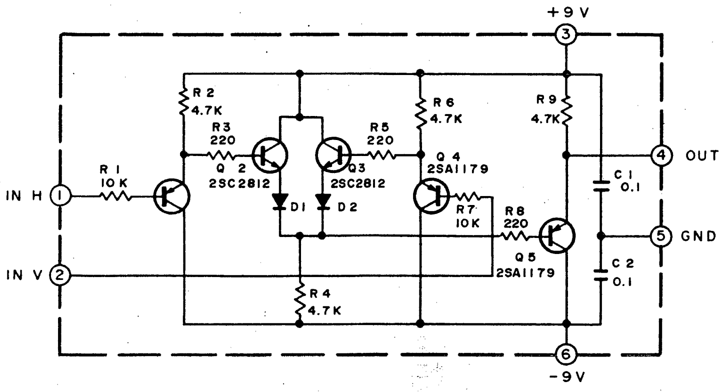


+9V
R4 4.7K
R8 220
Q5 2SC2812
C1 0.1
R1 10K
D1 MA152K
D2 MA152K
R7 10K
IN 1
Q1 2SC2812
R3 220
R5 220
Q4 2SC2812
OUT
GND
R2 4.7K
Q2 2SA1179
Q3 2SA1179
R6 220
R9 4.7K
C2 0.1
IN 2
-9V

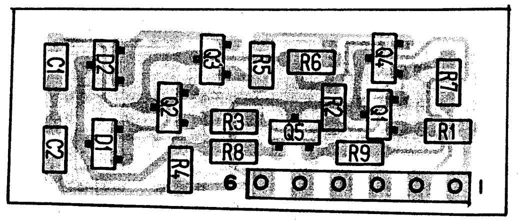


Q3
R6
D2
C2
Q4
R4
C1
R7
R5
R8
D1
Q5
Q1
Q2
R3
R2
R9
R1
6
1

● OR CBM (CBMC4357-00B) (CBM28/29/31/32)

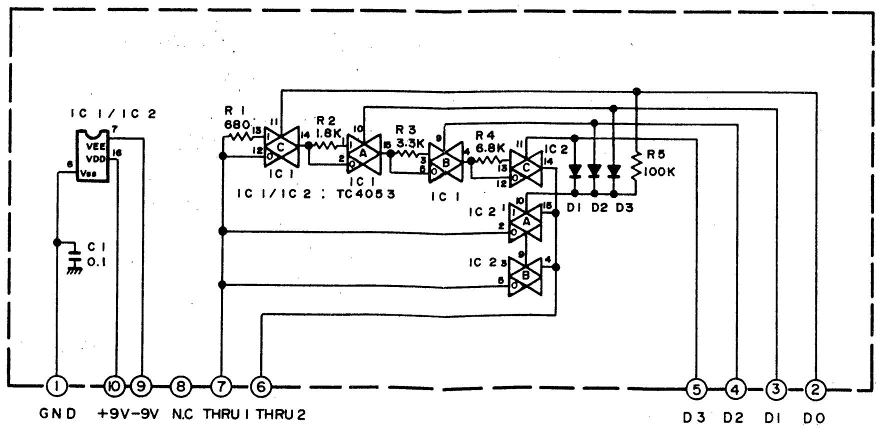


+9V
R2 4.7K
R6 4.7K
R9 4.7K
R3 220
R5 220
Q4 2SA1179
OUT
R1 10K
Q2 2SC2812
Q3 2SC2812
C1 0.1
IN H
D1
D2
R7 10K
R8 220
GND
Q5 2SA1179
C2 0.1
IN V
R4 4.7K
-9V

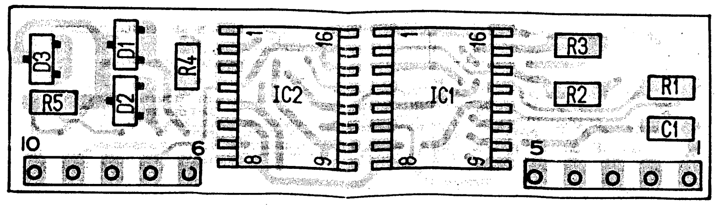


C1
D2
Q3
R5
R6
Q4
R7
Q2
R2
Q1
C2
D1
R3
Q5
R1
R8
R9
R4
6
1

● SFT CBM (CBMC4352-00B) (CBM1~8)

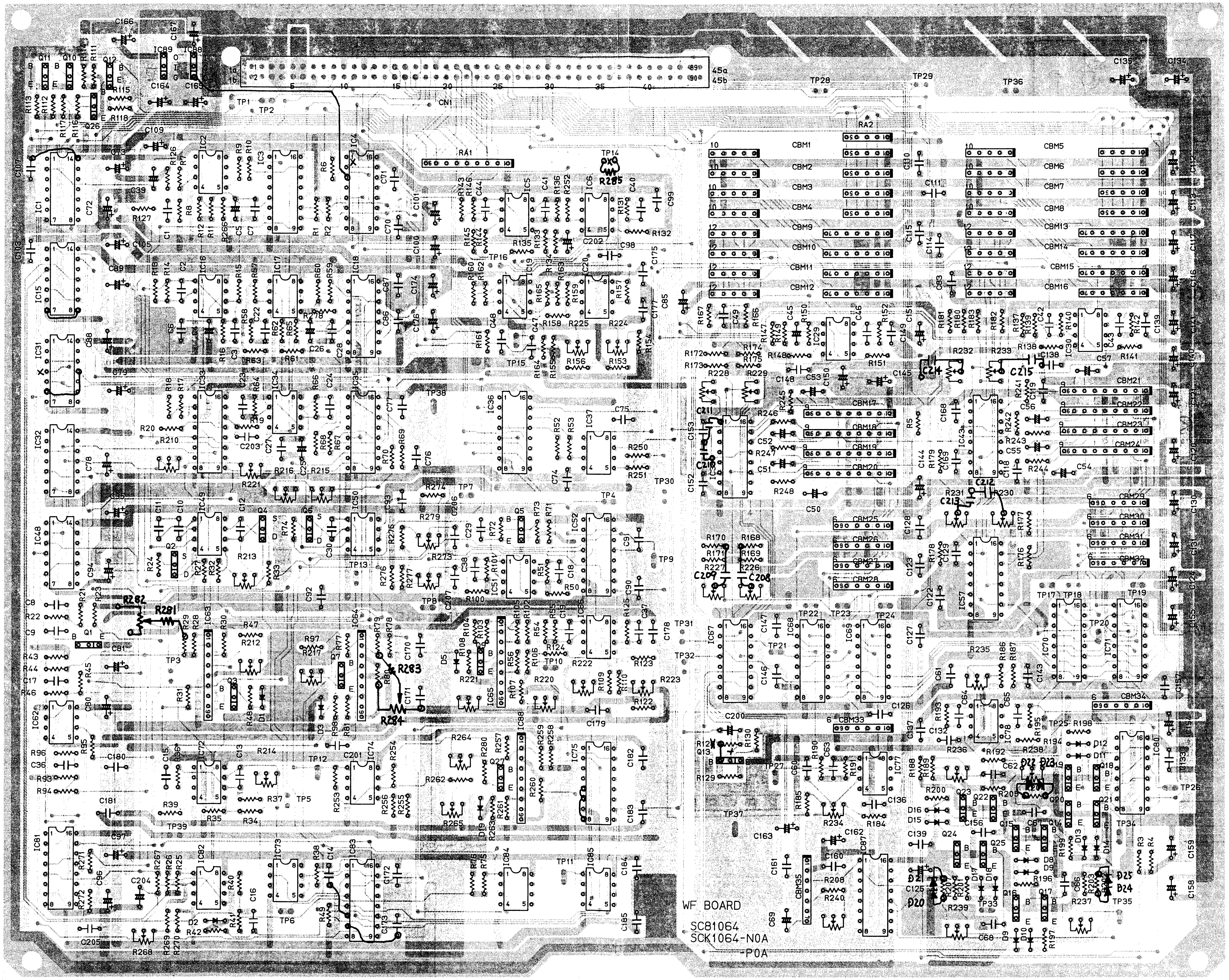


IC 1 / IC 2
VEE
VDD
Vss
C1 0.1
R1 680
R2 1.8K
R3 3.3K
R4 6.8K
IC 1
IC 2
IC 1 / IC 2 : TC4053
R5 100K
D1 D2 D3
GND
+9V-9V
NC
THRU 1
THRU 2
D3
D2
D1
D0

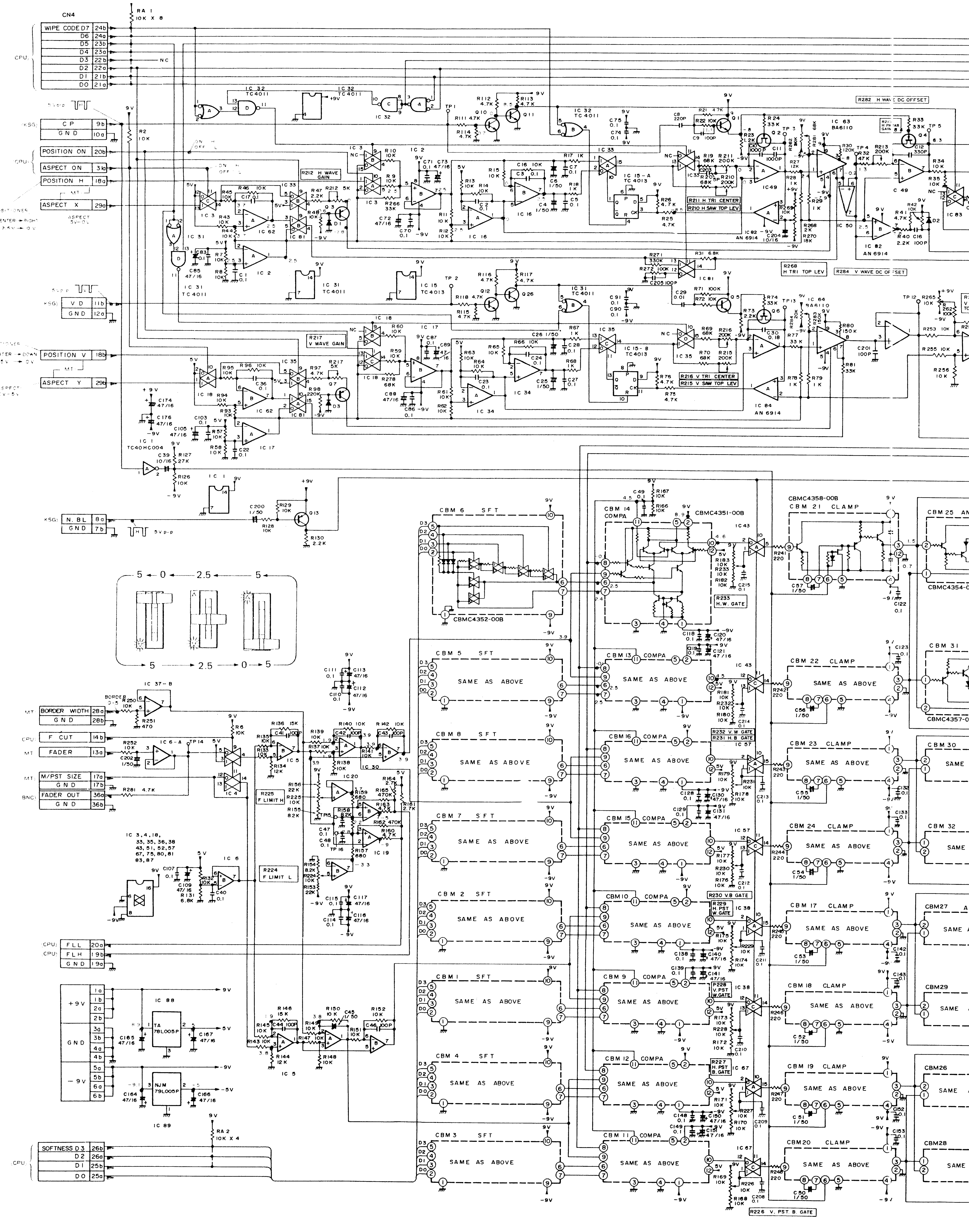


D3
D1
R4
R5
D2
IC2
IC1
R3
R2
R1
C1
10
6
5
1
16
8
9

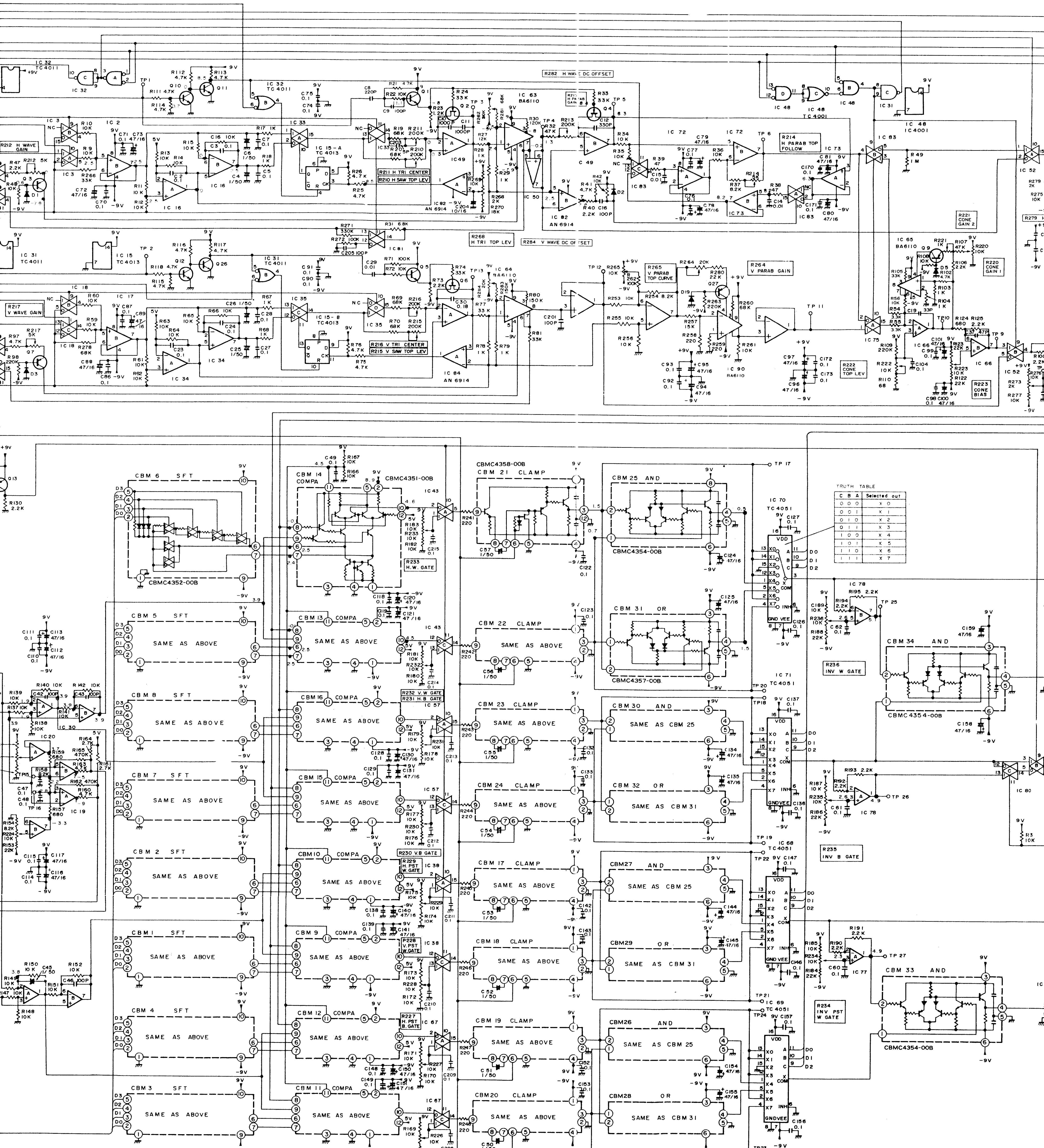
6.15 WF CIRCUIT BOARD (Parts side view) – Main Unit –


WF BOARD
SC81064
SCK1064-N0A
P0A
CN1
TP1
TP2
RA1
RA2
TP14
R285
R281
R282
R283
R284

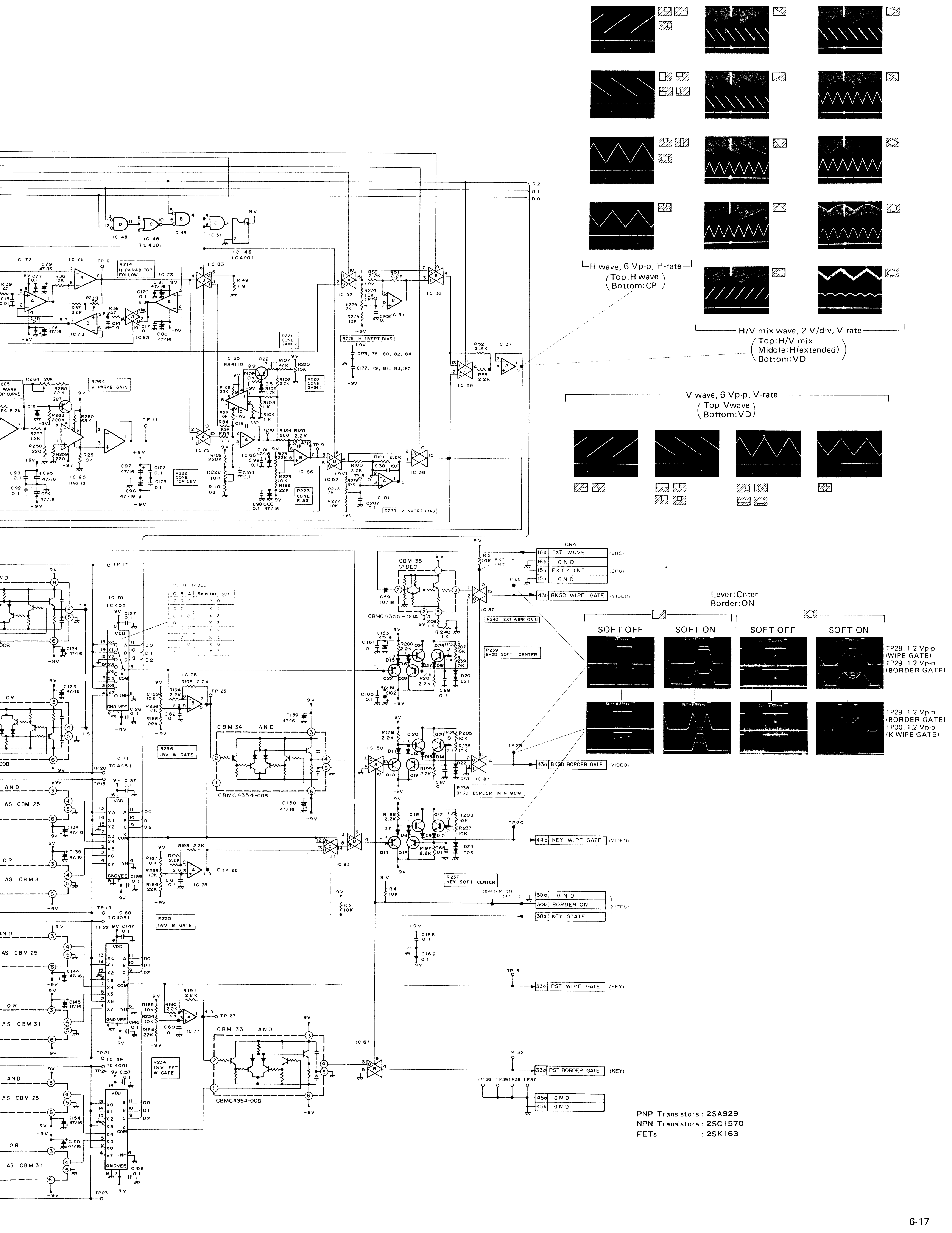
6.16 WF BOARD SCHEMATIC DIAGRAM — Main Unit —


CN4
CPU
WIPE CODE D7 24b
D6 24a
D5 23b
D4 23a
D3 22b
D2 22a
D1 21b
D0 21a
RA 1 10K X 8
NC
KSG
CP 9b
GND 10a
POSITION ON 20b
ASPECT ON 31a
POSITION H 18a
MT
ASPECT X 29a
POSITIONER
LEFT ← CENTER → RIGHT
ASPECT
VD 11b
GND 12a
POSITION V 18b
UP ← CENTER → DOWN
ASPECT Y 29b
IC 32 TC4011
IC 31 TC4011
IC 15 TC4013
IC 15-A TC4013
IC 15-B TC4013
IC 16
IC 33
IC 62
IC 2
IC 3
IC 81
IC 18
IC 17
IC 34
IC 35
IC 49
IC 63 BA6110
IC 64 BA6110
IC 82 AN 6914
IC 84 AN 6914
IC 1 TC40HC004
R212 H WAVE GAIN
R217 V WAVE GAIN
R211 H TRI CENTER
R210 H SAW TOP LEV
R216 V TRI CENTER
R215 V SAW TOP LEV
R268 H TRI TOP LEV
R284 V WAVE DC OFFSET
R282 H WAVE DC OFFSET
TP 1
TP 2
TP 3
TP 4
TP 5
TP 12
TP 13
Q 10
Q 11
Q 12
Q 26
N. BL 8a
GND 7b
5Vp-p
Q 13
C200 1/50
R129 10K
R128 10K
R130 2.2K
5 ← 0 ← 2.5 ← 5
5 → 2.5 → 0 → 5
CBM 6 SFT
CBMC4352-00B
CBM 5 SFT
CBM 8 SFT
CBM 7 SFT
CBM 2 SFT
CBM 1 SFT
CBM 4 SFT
CBM 3 SFT
SAME AS ABOVE
CBM 14 COMPA
CBMC4351-00B
CBM 13 COMPA
CBM 16 COMPA
CBM 15 COMPA
CBM 10 COMPA
CBM 9 COMPA
CBM 12 COMPA
CBM 11 COMPA
IC 43
IC 57
IC 38
IC 67
R233 H.W. GATE
R232 V.W. GATE
R231 H.B GATE
R230 V.B GATE
R229 H.PST W.GATE
R228 V.PST W.GATE
R227 H.PST B.GATE
R226 V. PST. B. GATE
CBMC4358-00B
CBM 21 CLAMP
CBM 22 CLAMP
CBM 23 CLAMP
CBM 24 CLAMP
CBM 17 CLAMP
CBM 18 CLAMP
CBM 19 CLAMP
CBM20 CLAMP
CBM 25
CBMC4354-0
CBM 31
CBMC4357-0
CBM 30
CBM 32
CBM27
CBM29
CBM26
CBM28
MT
BORDER WIDTH 28a
GND 28b
CPU
F CUT 14b
MT
FADER 13a
M/PST SIZE 17a
GND 17b
BNC
FADER OUT 36a
GND 36b
IC 37-B
IC 6-A
IC 4
IC 5
IC 20
IC 19
IC 6
IC 30
R225 F LIMIT H
R224 F LIMIT L
IC 3, 4, 18, 33, 35, 36, 38, 43, 51, 52, 57, 67, 75, 80, 81, 83, 87
CPU
FLL 20a
FLH 19b
GND 19a
+9V 1a 1b 2a 2b
GND 3a 3b 4a 4b
-9V 5a 5b 6a 6b
IC 88 TA 78L005P
IC 89 NJM 79L005P
C165 47/16
C167 47/16
C164 47/16
C166 47/16
RA 2 10K X 4
CPU
SOFTNESS D3 26b
D2 26a
D1 25b
D0 25a

C DIAGRAM — Main Unit —


IC 32 TC4011
IC 48 TC4001
IC 63 BA6110
IC 49
IC 82 AN 6914
IC 50
IC 72
IC 73
IC 83
IC 15 TC4013
IC 31 TC4011
IC 64 BA6110
IC 84 AN 6914
IC 90 BA6110
IC 65 BA6110
IC 66
IC 75
IC 52
R282 H WAVE DC OFFSET
R211 H TRI CENTER
R210 H SAW TOP LEV
R212 H WAVE GAIN
R214 H PARAB TOP FOLLOW
R268 H TRI TOP LEV
R284 V WAVE DC OFFSET
R265 V PARAB TOP CURVE
R264 V PARAB GAIN
R217 V WAVE GAIN
R216 V TRI CENTER
R215 V SAW TOP LEV
R221 CONE GAIN 2
R220 CONE GAIN 1
R222 CONE TOP LEV
R223 CONE BIAS
CBM 6 SFT
CBM 14 COMPA
CBMC4351-00B
CBMC4358-00B
CBM 21 CLAMP
CBM 25 AND
CBMC4352-00B
CBMC4354-00B
CBM 31 OR
CBMC4357-00B
R233 H.W. GATE
IC 70 TC4051
CBM 5 SFT
CBM 13 COMPA
CBM 22 CLAMP
SAME AS ABOVE
CBM 8 SFT
CBM16 COMPA
CBM 23 CLAMP
CBM 30 AND
SAME AS CBM 25
R232 V.W GATE
R231 H.B GATE
IC 71 TC4051
CBM 7 SFT
CBM 15 COMPA
CBM 24 CLAMP
CBM 32 OR
SAME AS CBM 31
CBM 2 SFT
CBM10 COMPA
CBM 17 CLAMP
CBM27 AND
R230 V.B GATE
R229 H.PST W.GATE
IC 68 TC4051
CBM 1 SFT
CBM 9 COMPA
CBM 18 CLAMP
CBM29 OR
P228 V.PST W.GATE
CBM 4 SFT
CBM 12 COMPA
CBM 19 CLAMP
CBM26 AND
R227 H.PST B.GATE
IC 69 TC4051
CBM 3 SFT
CBM 11 COMPA
CBM20 CLAMP
CBM28 OR
R226 V. PST B GATE
CBM 34 AND
CBM 33 AND
R236 INV W GATE
R235 INV B GATE
R234 INV PST W GATE
IC 78
IC 77
IC 80
TP 17
TP 25
TP 26
TP 27
TRUTH TABLE

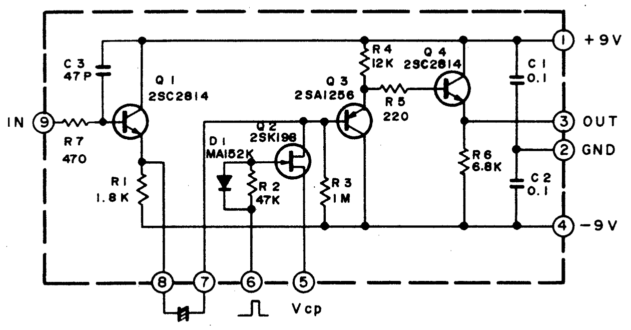
C B A	Selected out
0 0 0	X 0
0 0 1	X 1
0 1 0	X 2
0 1 1	X 3
1 0 0	X 4
1 0 1	X 5
1 1 0	X 6
1 1 1	X 7


H wave, 6 Vp-p, H-rate
(Top:H wave
Bottom:CP)
H/V mix wave, 2 V/div, V-rate
(Top:H/V mix
Middle:H(extended)
Bottom:VD)
V wave, 6 Vp-p, V-rate
(Top:Vwave
Bottom:VD)
Lever:Cnter
Border:ON
SOFT OFF
SOFT ON
SOFT OFF
SOFT ON
TP28, 1.2 Vp-p
(WIPE GATE)
TP29, 1.2 Vp-p
(BORDER GATE)
TP29 1.2 Vp-p
(BORDER GATE)
TP30, 1.2 Vp-p
(K WIPE GATE)
IC 48
TC4001
IC 31
IC 72
IC 73
IC 83
IC 52
IC 51
IC 36
IC 37
IC 65
BA6110
IC 90
IC 75
IC 66
R214 H PARAB TOP FOLLOW
R221 CONE GAIN 2
R220 CONE GAIN 1
R279 H INVERT BIAS
R264 V PARAB GAIN
R222 CONE TOP LEV
R223 CONE BIAS
R273 V INVERT BIAS
TP 6
TP 11
TP 9
D2
D1
D0
CN4
16a EXT WAVE (BNC)
16b GND
15a EXT/INT (CPU)
15b GND
43b BKGD WIPE GATE (VIDEO)
43a BKGD BORDER GATE (VIDEO)
44b KEY WIPE GATE (VIDEO)
30a GND
30b BORDER ON
38b KEY STATE (CPU)
33a PST WIPE GATE (KEY)
33b PST BORDER GATE (KEY)
45a GND
45b GND
TP 17
TP 28
TP 29
TP 30
TP 31
TP 32
TP 36 TP39 TP38 TP37
CBM 35 VIDEO
CBMC4355-00A
R240 EXT WIPE GAIN
R239 BKGD SOFT CENTER
R238 BKGD BORDER MINIMUM
R237 KEY SOFT CENTER
IC 87
IC 80
IC 67
TRUTH TABLE
C B A Selected out
IC 70
TC4051
IC 71
TC4051
IC 68
TC4051
IC 69
TC4051
IC 78
IC 77
TP 25
TP 26
TP 27
R236 INV W GATE
R235 INV B GATE
R234 INV PST W GATE
CBM 34 AND
CBMC4354-00B
CBM 33 AND
CBMC4354-00B
AS CBM 25
AS CBM 31
AND
OR
TP 18
TP 19
TP 20
TP 21
TP 22
TP 23
TP 24
9V
-9V

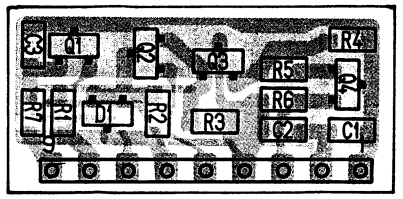
PNP Transistors : 2SA929
NPN Transistors : 2SC1570
FETs : 2SK163

6.17 VIDEO BOARD CBM — Main Unit —

● CLAMP CBM (CBMC4353-00B) (CBM61~64, 66~68, 70~73)

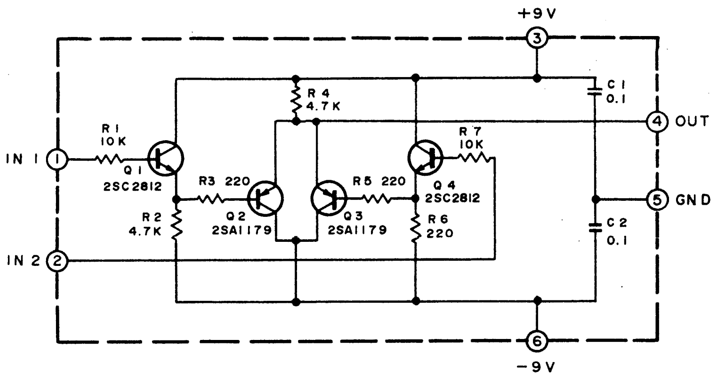


+9V
C3 47P
Q1 2SC2814
Q3 2SA1256
R4 12K
Q4 2SC2814
C1 0.1
IN
R7 470
R1 1.8K
D1 MA152K
Q2 2SK198
R2 47K
R5 220
R3 1M
R6 6.8K
C2 0.1
OUT
GND
-9V
Vcp

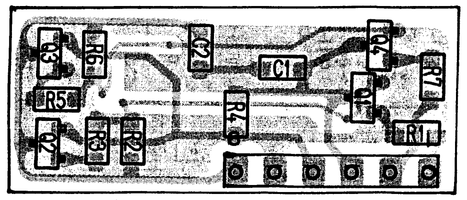


C3
Q1
R1
R7
D1
Q2
R2
Q3
R3
R4
R5
R6
C2
C1
Q4

● MASK CBM (CBMC4393-00B) (CBM65/69)

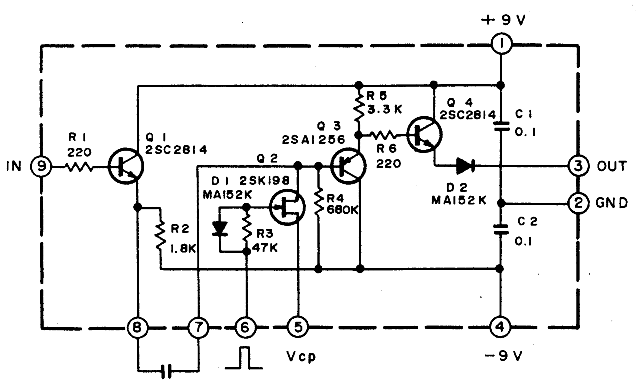


+9V
IN 1
IN 2
R1 10K
Q1 2SC2812
R2 4.7K
R3 220
Q2 2SA1179
R4 4.7K
Q3 2SA1179
R5 220
R7 10K
Q4 2SC2812
R6 220
C1 0.1
C2 0.1
OUT
GND
-9V

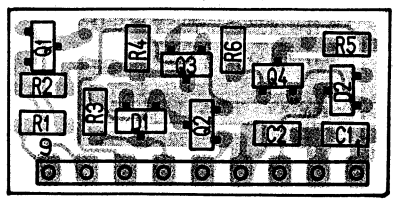


Q1
R6
R5
R2
R3
Q2
C1
R4
Q3
Q4
R7
R1

● CLCP CBM (CBMC4356-00A) (CBM31~37, 41~47, 51~57)

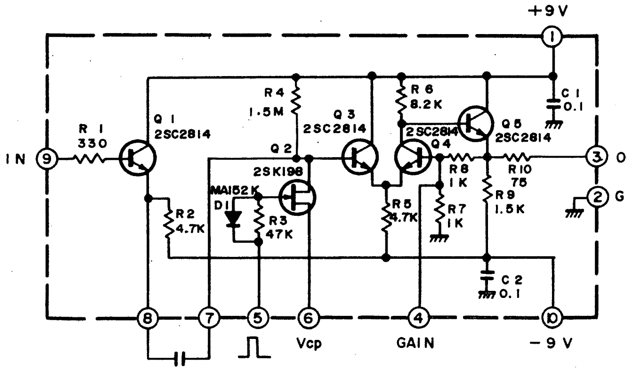


+9V
IN
R1 220
Q1 2SC2814
Q2
Q3 2SA1256
R5 5.3K
Q4 2SC2814
R6 220
C1 0.1
D1 2SK198
MA152K
R2 1.8K
R3 47K
R4 680K
D2 MA152K
C2 0.1
OUT
GND
Vcp
-9V

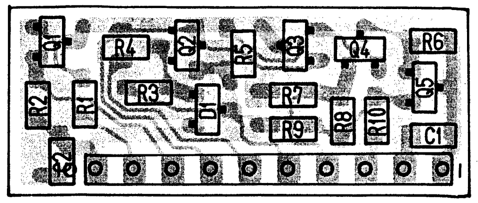


Q1
R2
R1
R4
R3
D1
Q3
R6
Q2
Q4
R5
C2
C1

● CLVA CBM (CBMC4358-00B) (CBM38~40, 48~50, 58~60, 74)

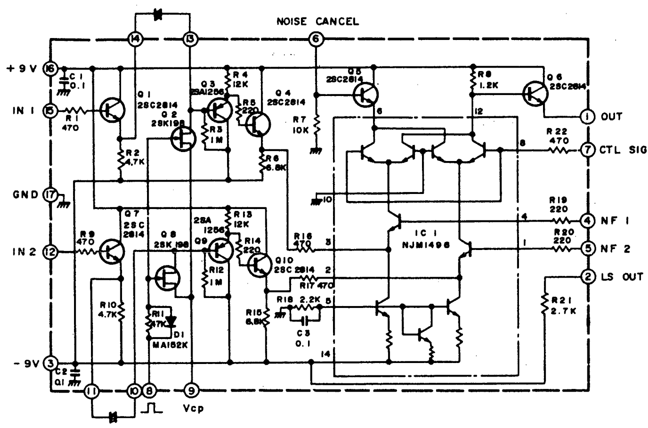


+9V
IN
R1 330
Q1 2SC2814
R4 1.5M
Q2 2SK198
Q3 2SC2814
R6 8.2K
Q4 2SC2814
Q5 2SC2814
C1 0.1
R2 4.7K
D1 MA152K
R3 47K
R5 4.7K
R8 1K
R7 1K
R10 75
R9 1.5K
C2 0.1
OUT
GND
Vcp
GAIN
-9V

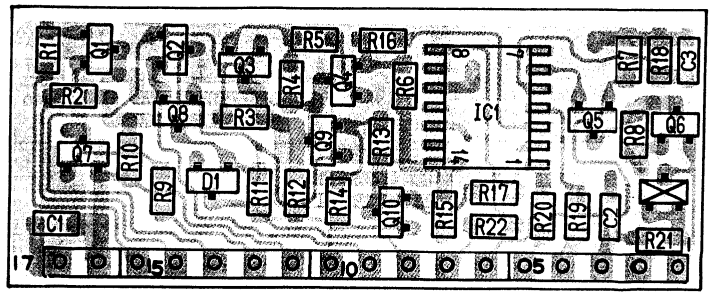


Q1
R2
R1
R4
R3
D1
Q2
Q3
R5
R7
R9
R8
R10
Q4
Q5
R6
C1

● EFF 1 CBM (CBMC4350-00B) (CBM1~10)

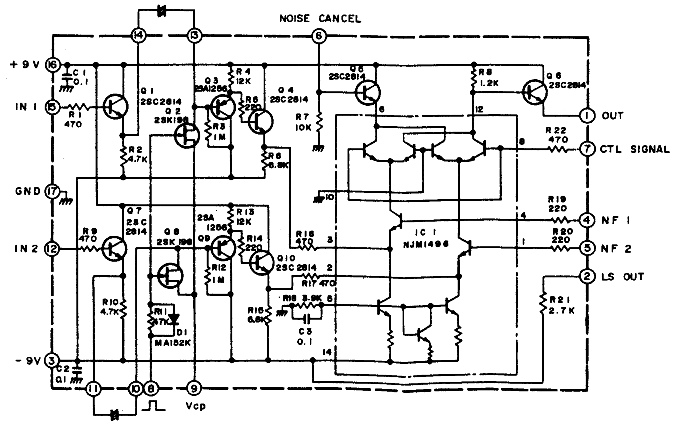


NOISE CANCEL
+9V
IN 1
GND
IN 2
-9V
Q1 2SC2814
Q2 2SK198
Q3 2SA1256
Q4 2SC2814
Q5 2SC2814
Q6 2SC2814
Q7 2SC2814
Q8 2SK198
Q9 2SA1256
Q10 2SC2814
IC1 NJM1496
D1 MA152K
OUT
CTL SIGNAL
NF 1
NF 2
LS OUT
Vcp

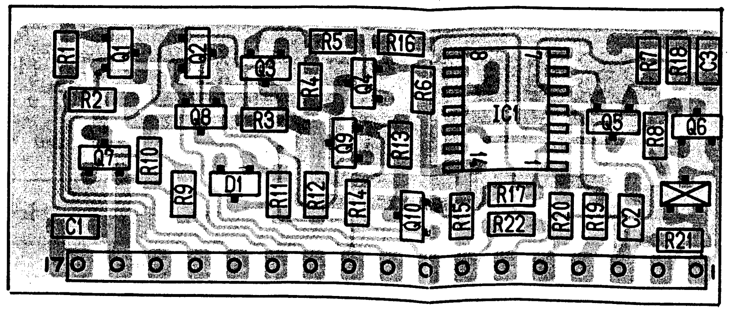


R1
Q1
Q2
Q3
R5
R16
R4
R6
IC1
R7
R18
C3
R2
Q8
R3
Q4
Q5
R8
Q6
Q7
R10
R9
D1
R11
R12
R14
Q9
R13
Q10
R15
R17
R22
R20
R19
C2
R21
C1

● EFF 2 CBM (CBMC4366-00B) (CBM11~30)

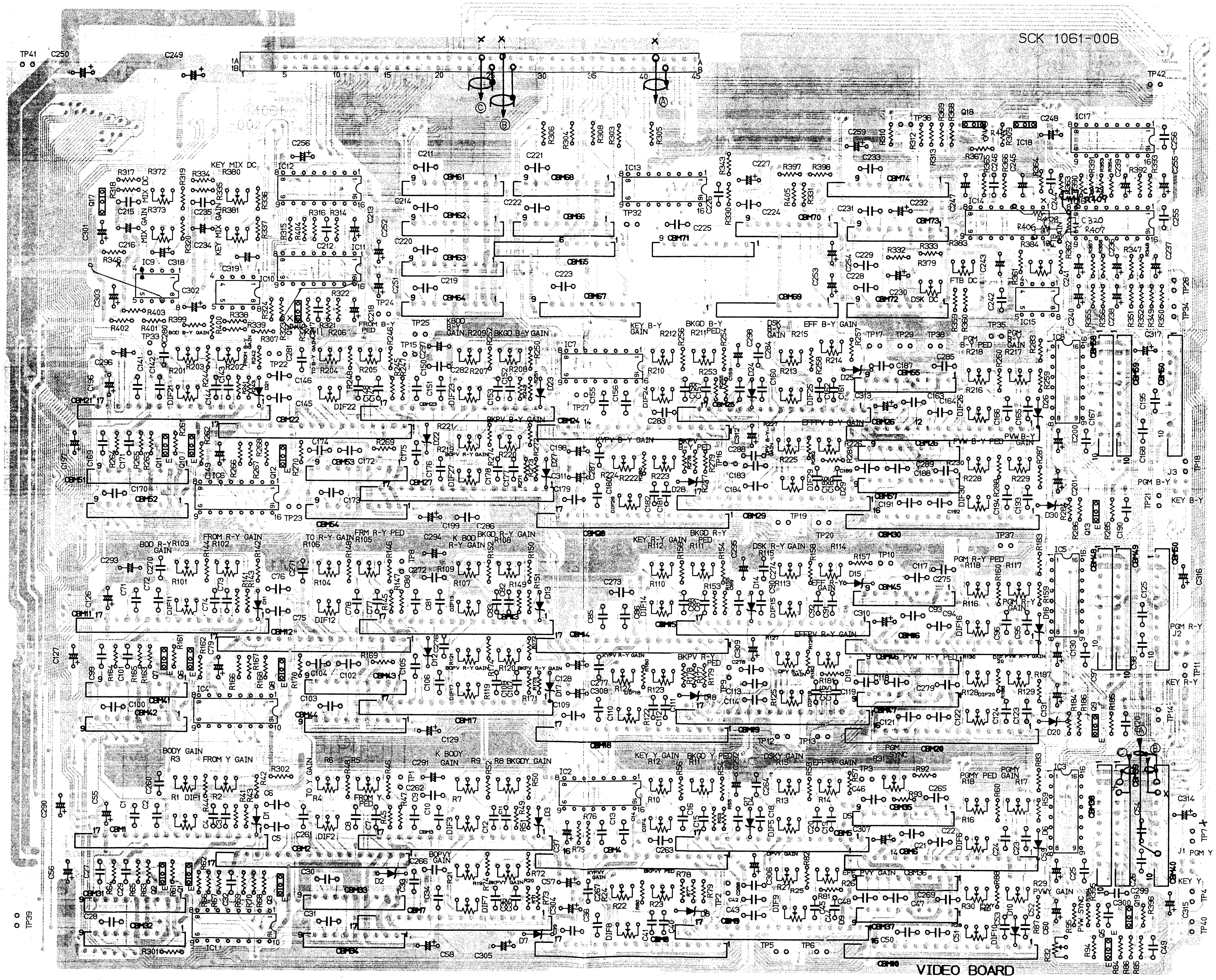


NOISE CANCEL
+9V
IN 1
GND
IN 2
-9V
Q1 2SC2814
Q2 2SK198
Q3 2SA1256
Q4 2SC2814
Q5 2SC2814
Q6 2SC2814
Q7 2SC2814
Q8 2SK198
Q9 2SA1256
Q10 2SC2814
IC1 NJM1496
D1 MA152K
OUT
CTL SIGNAL
NF 1
NF 2
LS OUT
Vcp



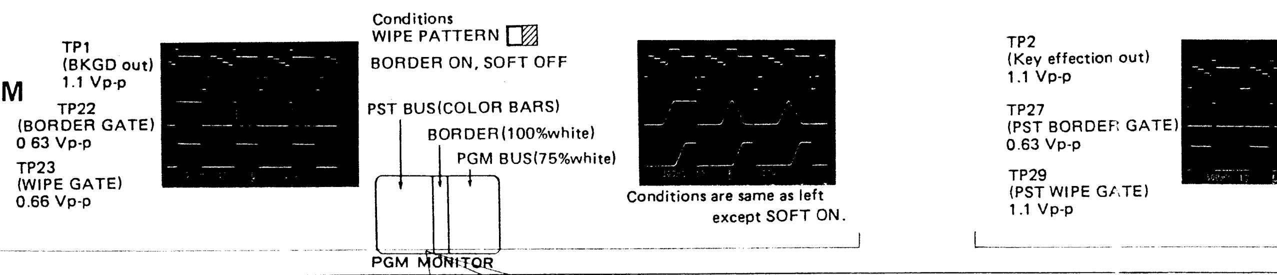
R1
Q1
Q2
Q3
R5
R16
R4
R6
IC1
R7
R18
C3
R2
Q8
R3
Q4
Q5
R8
Q6
Q7
R10
R9
D1
R11
R12
R14
Q9
R13
Q10
R15
R17
R22
R20
R19
C2
R21
C1

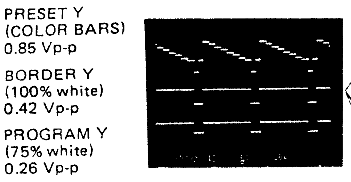
6.18 VIDEO CIRCUIT BOARD (Parts side view) — Main Unit —

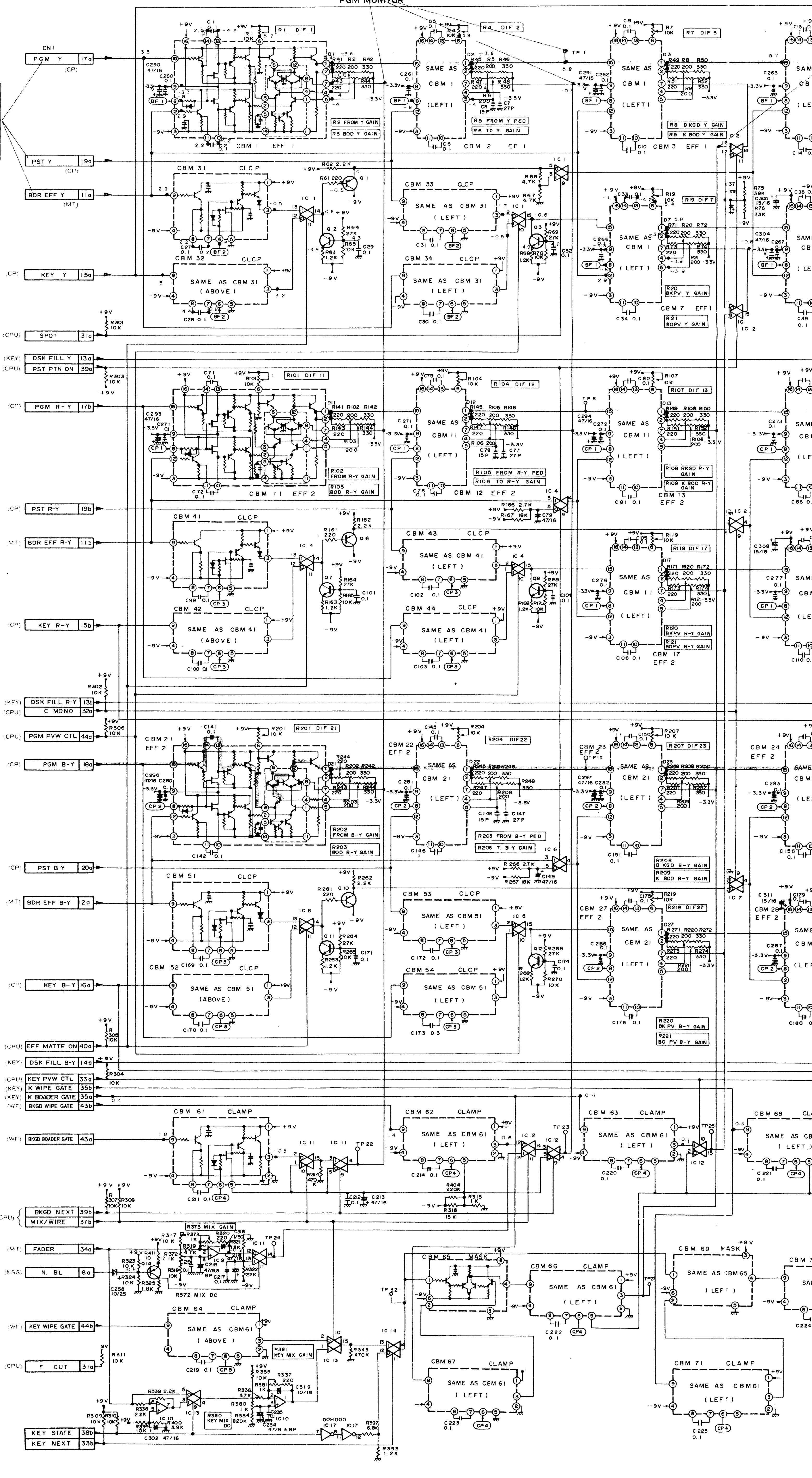

SCK 1061-00B
VIDEO BOARD
TP41
TP42
TP39
TP40
J1 PGM Y
J2 PGM R-Y
J3 PGM B-Y
KEY B-Y
KEY R-Y
KEY Y
KEY MIX DC
BODY GAIN
FROM Y GAIN
FROM R-Y GAIN
FROM B-Y PED
KEY Y GAIN
KEY R-Y GAIN
KEY B-Y GAIN
EFF B-Y GAIN
DSK R-Y GAIN
PGM B-Y PED
PGM R-Y PED
PGMY PED GAIN
PVWY GAIN
FTB DC
DSK DC

6.19 VIDEO BOARD SCHEMATIC DIAGRAM

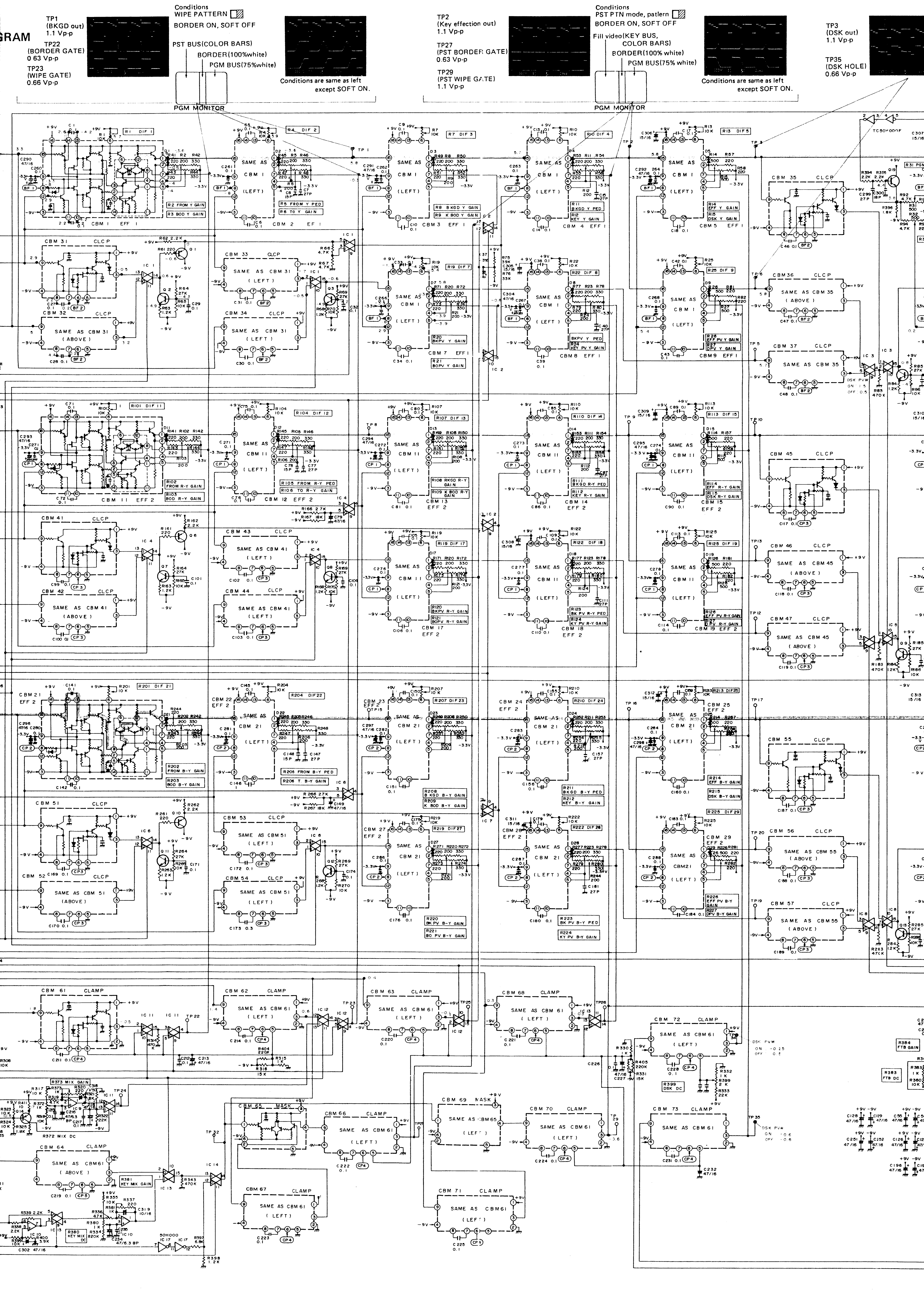
– Main Unit –

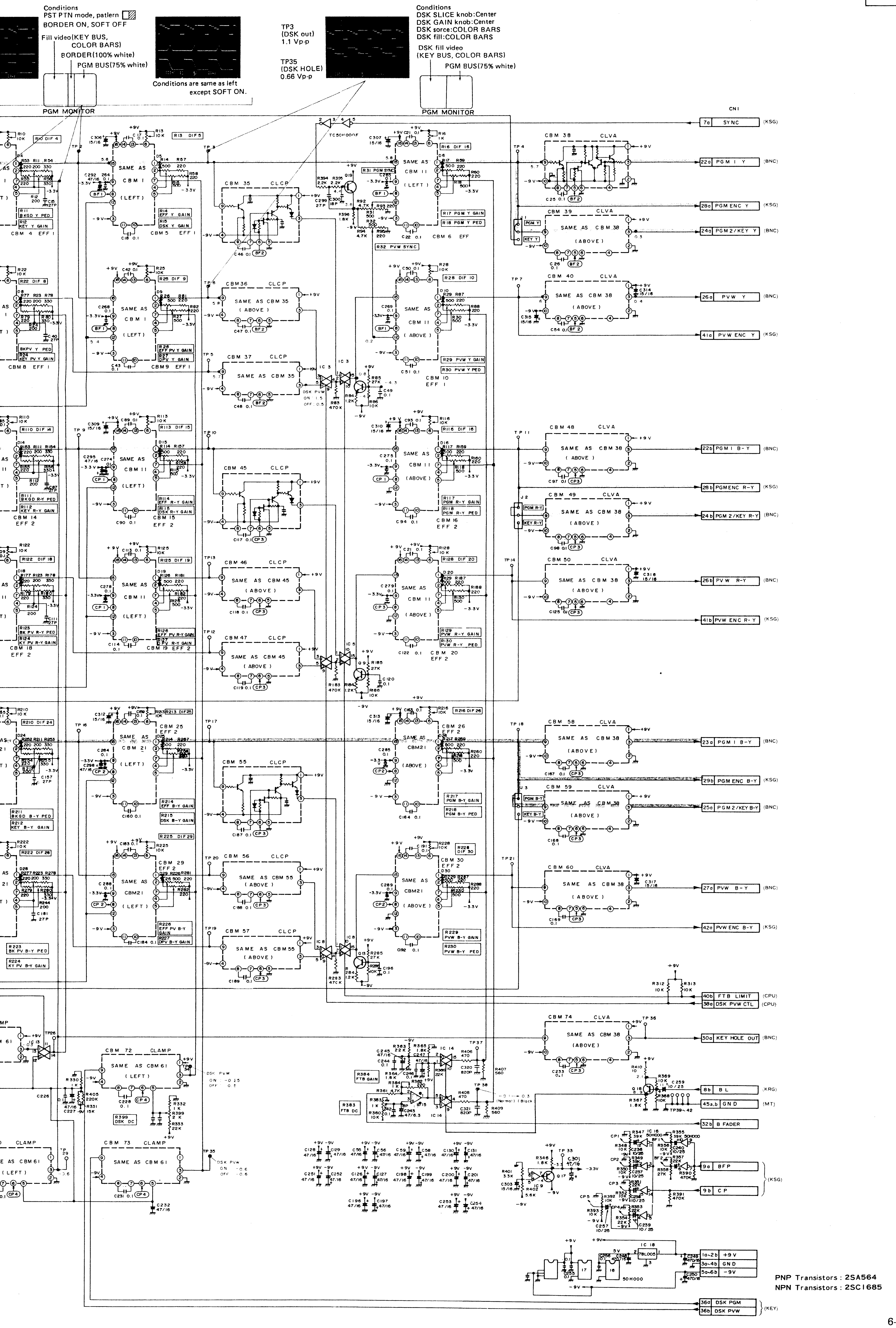

TP1
(BKGD out)
1.1 Vp-p
TP22
(BORDER GATE)
0.63 Vp-p
TP23
(WIPE GATE)
0.66 Vp-p
Conditions
WIPE PATTERN ▨
BORDER ON, SOFT OFF
PST BUS(COLOR BARS)
BORDER(100%white)
PGM BUS(75%white)
PGM MONITOR
Conditions are same as left
except SOFT ON.
TP2
(Key effection out)
1.1 Vp-p
TP27
(PST BORDER GATE)
0.63 Vp-p
TP29
(PST WIPE GATE)
1.1 Vp-p


PRESET Y
(COLOR BARS)
0.85 Vp-p
BORDER Y
(100% white)
0.42 Vp-p
PROGRAM Y
(75% white)
0.26 Vp-p


CN1
PGM Y 17a
PST Y 19a
BDR EFF Y 11a
KEY Y 15a
SPOT 31a
DSK FILL Y 13a
PST PTN ON 39a
PGM R-Y 17b
PST R-Y 19b
BDR EFF R-Y 11b
KEY R-Y 15b
DSK FILL R-Y 13b
C MONO 32a
PGM PVW CTL 44a
PGM B-Y 18a
PST B-Y 20a
BDR EFF B-Y 12a
KEY B-Y 16a
EFF MATTE ON 40a
DSK FILL B-Y 14a
KEY PVW CTL 33a
K WIPE GATE 35b
K BOADER GATE 35a
BKGD WIPE GATE 43b
BKGD BOADER GATE 43a
BKGD NEXT 39b
MIX/WIRE 37b
FADER 34a
N. BL 8a
KEY WIPE GATE 44b
F CUT 31a
KEY STATE 38b
KEY NEXT 33b
CBM 1 EFF 1
CBM 2 EFF 1
CBM 3 EFF 1
CBM 31 CLCP
CBM 32 CLCP
CBM 33 CLCP
CBM 34 CLCP
CBM 7 EFF 1
CBM 11 EFF 2
CBM 12 EFF 2
CBM 13 EFF 2
CBM 41 CLCP
CBM 42 CLCP
CBM 43 CLCP
CBM 44 CLCP
CBM 17 EFF 2
CBM 21 EFF 2
CBM 22 EFF 2
CBM 23 EFF 2
CBM 24 EFF 2
CBM 27 EFF 2
CBM 51 CLCP
CBM 52 CLCP
CBM 53 CLCP
CBM 54 CLCP
CBM 61 CLAMP
CBM 62 CLAMP
CBM 63 CLAMP
CBM 64 CLAMP
CBM 65 MASK
CBM 66 CLAMP
CBM 67 CLAMP
CBM 68 CLAMP
CBM 69 MASK
CBM 71 CLAMP
SAME AS CBM 1 (LEFT)
SAME AS CBM 31 (ABOVE)
SAME AS CBM 31 (LEFT)
SAME AS CBM 11 (LEFT)
SAME AS CBM 41 (ABOVE)
SAME AS CBM 41 (LEFT)
SAME AS CBM 21 (LEFT)
SAME AS CBM 51 (ABOVE)
SAME AS CBM 51 (LEFT)
SAME AS CBM 61 (LEFT)
SAME AS CBM61 (ABOVE)
SAME AS CBM 65
R1 DIF 1
R4 DIF 2
R7 DIF 3
R2 FROM Y GAIN
R3 BOD Y GAIN
R5 FROM Y PED
R6 TO Y GAIN
R8 BKGD Y GAIN
R9 K BOD Y GAIN
R19 DIF 7
R20 BKPV Y GAIN
R21 BOPV Y GAIN
R101 DIF 11
R104 DIF 12
R107 DIF 13
R102 FROM R-Y GAIN
R103 BOD R-Y GAIN
R105 FROM R-Y PED
R106 TO R-Y GAIN
R108 BKGD R-Y GAIN
R109 K BOD R-Y GAIN
R119 DIF 17
R120 BKPV R-Y GAIN
R121 BOPV R-Y GAIN
R201 DIF 21
R204 DIF 22
R207 DIF 23
R202 FROM B-Y GAIN
R203 BOD B-Y GAIN
R205 FROM B-Y PED
R206 T. B-Y GAIN
R208 B KGD B-Y GAIN
R209 K BOD B-Y GAIN
R219 DIF 27
R220 BK PV B-Y GAIN
R221 BO PV B-Y GAIN
R373 MIX GAIN
R372 MIX DC
R381 KEY MIX GAIN
R380 KEY MIX DC
TP 1
TP 8
TP15
TP22
TP23
TP24
TP25
TP32
IC 1
IC 2
IC 4
IC 6
IC 7
IC 9
IC 10
IC 11
IC 12
IC 13
IC 14
IC 17
50H000
(CP)
(MT)
(CPU)
(KEY)
(WF)
(KSG)
+9V
-9V
-3.3V

GRAM

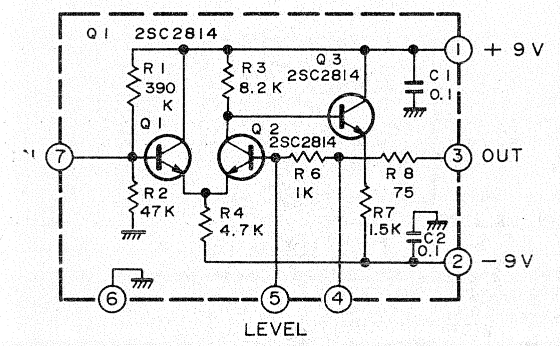

TP1
(BKGD out)
1.1 Vp-p
TP22
(BORDER GATE)
0.63 Vp-p
TP23
(WIPE GATE)
0.66 Vp-p
Conditions
WIPE PATTERN ▨
BORDER ON, SOFT OFF
PST BUS(COLOR BARS)
BORDER(100%white)
PGM BUS(75%white)
PGM MONITOR
Conditions are same as left
except SOFT ON.
TP2
(Key effection out)
1.1 Vp-p
TP27
(PST BORDER GATE)
0.63 Vp-p
TP29
(PST WIPE GATE)
1.1 Vp-p
Conditions
PST PTN mode, patlern ▨
BORDER ON, SOFT OFF
Fill video(KEY BUS,
COLOR BARS)
BORDER(100% white)
PGM BUS(75% white)
PGM MONITOR
Conditions are same as left
except SOFT ON.
TP3
(DSK out)
1.1 Vp-p
TP35
(DSK HOLE)
0.66 Vp-p
TC50H000F
CBM 1 EFF 1
R1 DIF 1
R2 FROM Y GAIN
R3 BOD Y GAIN
CBM 2 EF 1
R4 DIF 2
R5 FROM Y PED
R6 TO Y GAIN
CBM 3 EFF 1
R7 DIF 3
R8 BKGD Y GAIN
R9 K BODY Y GAIN
CBM 4 EFF 1
R10 DIF 4
R11 BKGD Y PED
R12 KEY Y GAIN
CBM 5 EFF 1
R13 DIF 5
R14 EFF Y GAIN
R15 DSK Y GAIN
CBM 31 CLCP
CBM 32 CLCP
CBM 33 CLCP
CBM 34 CLCP
CBM 35 CLCP
CBM 36 CLCP
CBM 37 CLCP
CBM 7 EFF 1
R19 DIF 7
R20 BKPV Y GAIN
R21 BOPV Y GAIN
CBM 8 EFF 1
R22 DIF 8
BKPV Y PED
R24 KEY PV Y GAIN
CBM 9 EFF 1
R25 DIF 9
R26 EFF PV Y GAIN
R27 DPV Y GAIN
DSK PVW
ON 1.5
OFF 0.5
CBM 11 EFF 2
R101 DIF 11
R102 FROM R-Y GAIN
R103 BOD R-Y GAIN
CBM 12 EFF 2
R104 DIF 12
R105 FROM R-Y PED
R106 TO R-Y GAIN
CBM 13 EFF 2
R107 DIF 13
R108 BKGD R-Y GAIN
R109 K BOD R-Y GAIN
CBM 14 EFF 2
R110 DIF 14
R111 BKGD R-Y PED
R112 KEY R-Y GAIN
CBM 15 EFF 2
R113 DIF 15
R114 EFF R-Y GAIN
R115 DSK R-Y GAIN
CBM 41 CLCP
CBM 42 CLCP
CBM 43 CLCP
CBM 44 CLCP
CBM 45 CLCP
CBM 46 CLCP
CBM 47 CLCP
CBM 17 EFF 2
R119 DIF 17
R120 BKPV R-Y GAIN
R121 BOPV R-Y GAIN
CBM 18 EFF 2
R122 DIF 18
R123 BK PV R-Y PED
R124 KY PV R-Y GAIN
CBM 19 EFF 2
R125 DIF 19
R126 EFF PV R-Y GAIN
R127 DPV R-Y GAIN
CBM 21 EFF 2
R201 DIF 21
R202 FROM B-Y GAIN
R203 BOD B-Y GAIN
CBM 22 EFF 2
R204 DIF22
R205 FROM B-Y PED
R206 T. B-Y GAIN
CBM 23 EFF 2
R207 DIF 23
R208 B KGD B-Y GAIN
R209 K BOD B-Y GAIN
CBM 24 EFF 2
R210 DIF 24
R211 BKGD B-Y PED
R212 KEY B-Y GAIN
CBM 25 EFF 2
R213 DIF25
R214 EFF B-Y GAIN
R215 DSK B-Y GAIN
CBM 51 CLCP
CBM 52 CLCP
CBM 53 CLCP
CBM 54 CLCP
CBM 55 CLCP
CBM 56 CLCP
CBM 57 CLCP
CBM 27 EFF 2
R219 DIF27
R220 BK PV B-Y GAIN
R221 BO PV B-Y GAIN
CBM 28 EFF 2
R222 DIF 28
R223 BK PV B-Y PED
R224 KY PV B-Y GAIN
CBM 29 EFF 2
R225 DIF29
R226 EFF PV B-Y GAIN
R227 DPV B-Y GAIN
CBM 61 CLAMP
CBM 62 CLAMP
CBM 63 CLAMP
CBM 64 CLAMP
CBM 65 MASK
CBM 66 CLAMP
CBM 67 CLAMP
CBM 68 CLAMP
CBM 69 MASK
CBM 70 CLAMP
CBM 71 CLAMP
CBM 72 CLAMP
CBM 73 CLAMP
SAME AS CBM 61
R373 MIX GAIN
R372 MIX DC
R381 KEY MIX GAIN
R380 KEY MIX DC
R399 DSK DC
R384 FTB GAIN
R383 FTB DC
DSK PVW
ON -0.25
OFF -0.5
DSK PVW
ON -0.6
OFF -0.6
TP 24
TP 25
TP 26
TP 32
TP 33
IC 11
IC 12
IC 13
IC 14
IC 17

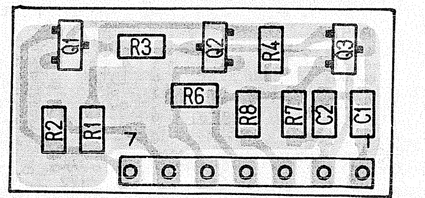

Conditions
PST PTN mode, pattern ▨
BORDER ON, SOFT OFF
Fill video(KEY BUS, COLOR BARS)
BORDER(100% white)
PGM BUS(75% white)
PGM MONITOR
Conditions are same as left except SOFT ON.
TP3 (DSK out) 1.1 Vp-p
TP35 (DSK HOLE) 0.66 Vp-p
Conditions
DSK SLICE knob:Center
DSK GAIN knob:Center
DSK sorce:COLOR BARS
DSK fill:COLOR BARS
DSK fill video (KEY BUS, COLOR BARS)
PGM BUS(75% white)
PGM MONITOR
CN1
7a SYNC (KSG)
22a PGM 1 Y (BNC)
28a PGM ENC Y (KSG)
24a PGM 2/KEY Y (BNC)
26a PVW Y (BNC)
41a PVW ENC Y (KSG)
22b PGM 1 B-Y (BNC)
28b PGMENC R-Y (KSG)
24b PGM 2/KEY R-Y (BNC)
26b PVW R-Y (BNC)
41b PVW ENC R-Y (KSG)
23a PGM 1 B-Y (BNC)
29b PGM ENC B-Y (KSG)
25a PGM 2/KEY B-Y (BNC)
27a PVW B-Y (BNC)
42a PVW ENC B-Y (KSG)
40b FTB LIMIT (CPU)
38a DSK PVW CTL (CPU)
30a KEY HOLE OUT (BNC)
8b BL (KRG)
45a,b GND (MT)
32b B FADER
9a BFP (KSG)
9b CP
1a~2b +9V
3a~4b GND
5a~6b -9V
36a DSK PGM (KEY)
36b DSK PVW
CBM 35 CLCP
CBM 36 CLCP
CBM 37 CLCP
CBM 45 CLCP
CBM 46 CLCP
CBM 47 CLCP
CBM 55 CLCP
CBM 56 CLCP
CBM 57 CLCP
CBM 38 CLVA
CBM 39 CLVA
CBM 40 CLVA
CBM 48 CLVA
CBM 49 CLVA
CBM 50 CLVA
CBM 58 CLVA
CBM 59 CLVA
CBM 60 CLVA
CBM 74 CLVA
CBM 72 CLAMP
CBM 73 CLAMP
CBM 4 EFF 1
CBM 5 EFF 1
CBM 6 EFF
CBM 8 EFF 1
CBM 9 EFF 1
CBM 10 EFF 1
CBM 14 EFF 2
CBM 15 EFF 2
CBM 16 EFF 2
CBM 18 EFF 2
CBM 19 EFF 2
CBM 20 EFF 2
CBM 25 EFF 2
CBM 26 EFF 2
CBM 29 EFF 2
CBM 30 EFF 2
R31 PGM SYNC
R32 PVW SYNC
R384 FTB GAIN
R383 FTB DC
R399 DSK DC
DSK PVW ON -1.5 OFF -0.5
DSK PVW ON -0.25 OFF -0.5
DSK PVW ON -0.6 OFF -0.6
(Normal) (Black)
TC50H00NF
50H000
78L005

PNP Transistors : 2SA564
NPN Transistors : 2SC1685

6.20 KSG BOARD CBM — Main Unit —

- VIDEO CBM (CBMC4355-00A) (CBM1~7)

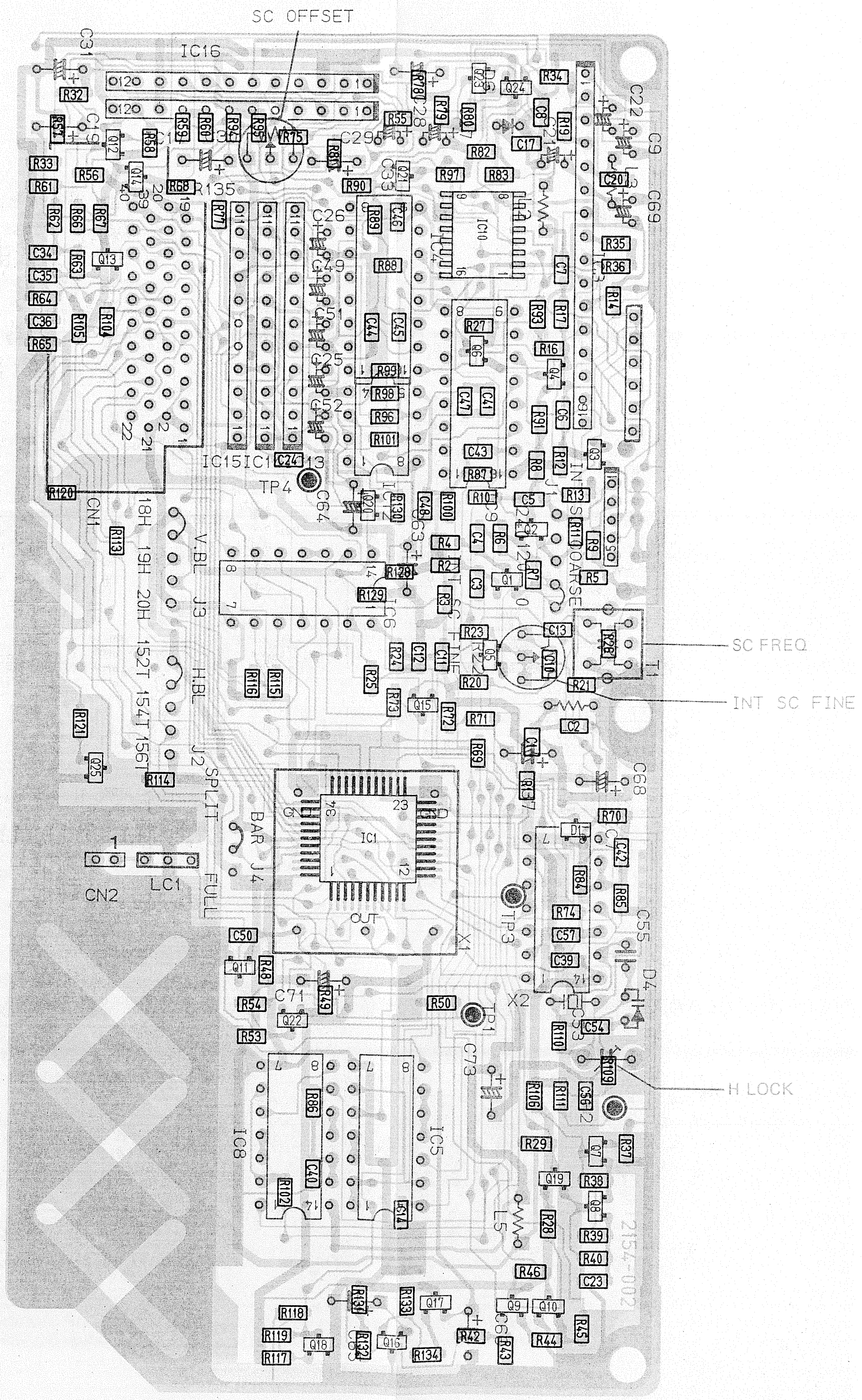

Q1 2SC2814
R1 390 K
Q1
R2 47K
R3 8.2K
Q3 2SC2814
Q2 2SC2814
R4 4.7K
R6 1K
R8 75
R7 1.5K
C1 0.1
C2 0.1
① +9V
③ OUT
② −9V
⑦
⑥
⑤
④
LEVEL


Q1
R3
Q2
R4
Q3
R6
R2
R1
R8
R7
C2
C1
7

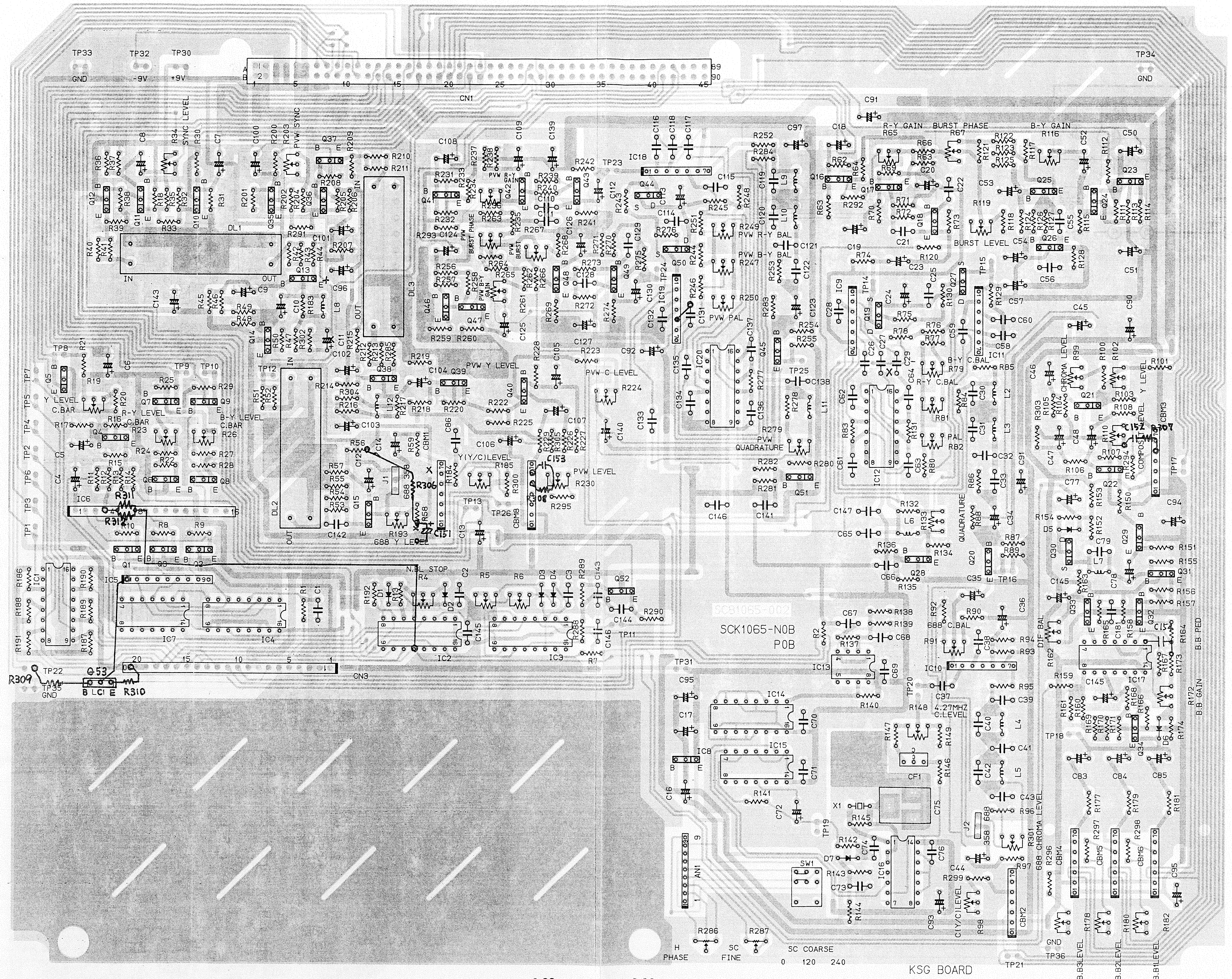
6.21-N SG CIRCUIT BOARD (NTSC) — Main Unit —

(Soldered side view)

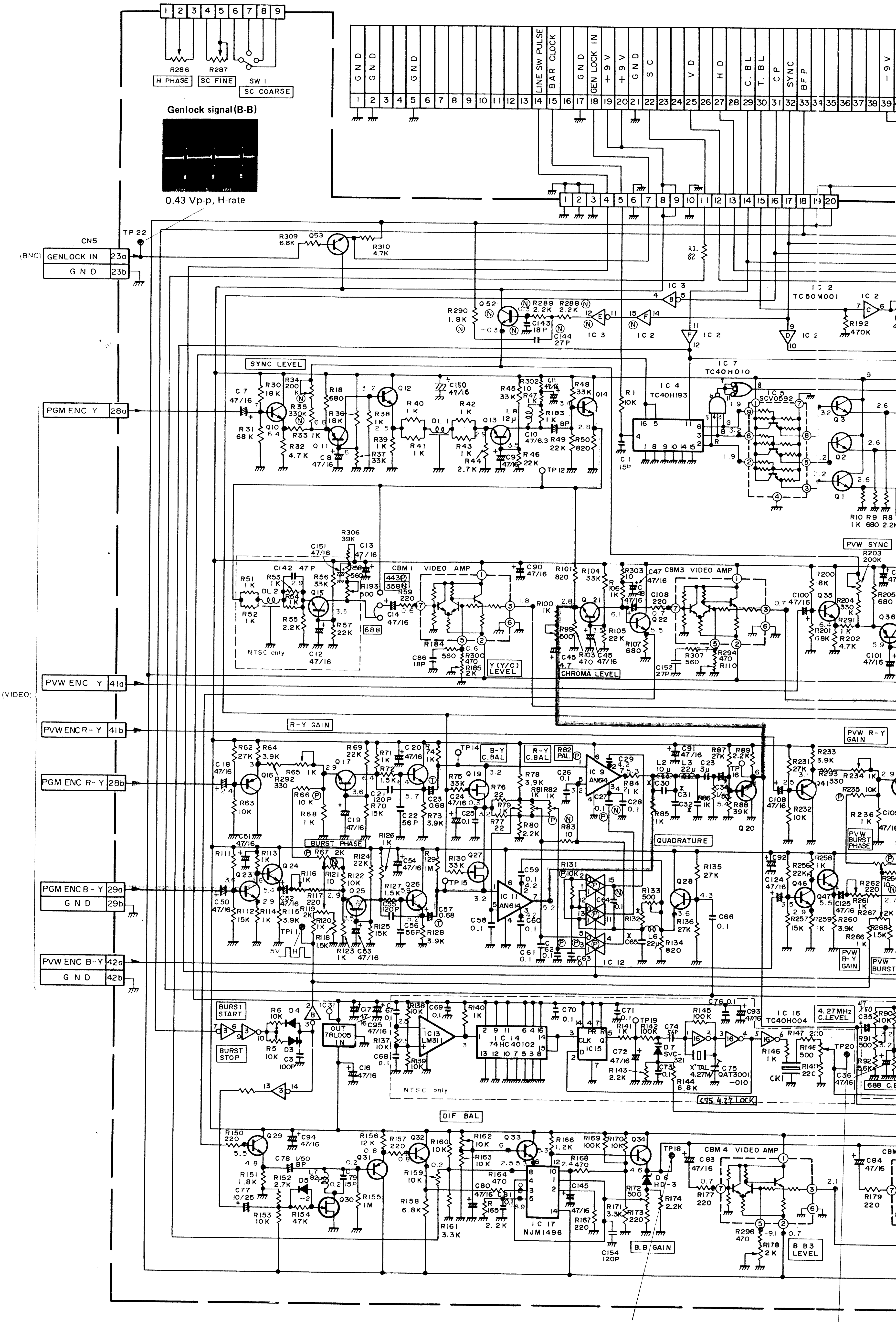
- For schematic diagram, refer to the section 6.24-N.

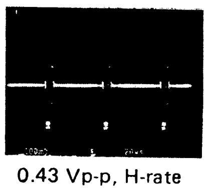

SC OFFSET
SC FREQ
INT SC FINE
H LOCK
IC16
IC15
IC1
IC10
IC5
IC8
CN1
CN2
LC1
J2 SPLIT
J3
J4 BAR
FULL
V.BL
H.BL
TP1
TP3
TP4
X1
X2
T1
L5
2154-002

6.22 KSG CIRCUIT BOARD (Parts side view) — Main Unit —

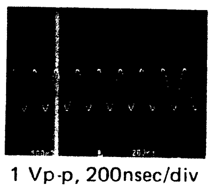

TP33
GND
TP32
-9V
TP30
+9V
CN1
TP34
GND
SYNC LEVEL
PVW SYNC
R-Y GAIN
BURST PHASE
B-Y GAIN
BURST LEVEL
PVW R-Y BAL
PVW B-Y BAL
PVW PAL
PVW Y LEVEL
PVW C LEVEL
PVW QUADRATURE
PVW LEVEL
Y(Y/C)LEVEL
Y LEVEL
C.BAR
R-Y LEVEL
B-Y LEVEL
CHROMA LEVEL
COMPOS
B-Y C.BAL
R-Y C.BAL
PAL
QUADRATURE
C.BAL
DIF BAL
4.27MHZ
C.LEVEL
C(Y/C)LEVEL
CHROMA LEVEL
N.BL STOP
DL1
DL2
DL3
IN
OUT
IC1
IC2
IC3
IC4
IC5
IC6
IC7
CN3
TP22
TP35
GND
Q53
R309
R310
SCK1065-N0B
P0B
SW1
AN1
CF1
X1
TP36
GND
B.B3LEVEL
B.B2LEVEL
B.B1LEVEL
B.B PED
B.B GAIN
H PHASE
R286
R287
SC FINE
SC COARSE
0
120
240
KSG BOARD
TP21

6.23 KSG BOARD SCHEMATIC DIAGRAM — Main Unit —


Genlock signal (B-B)
0.43 Vp-p, H-rate
R286 H. PHASE
R287 SC FINE
SW I SC COARSE
GND
GND
GND
LINE SW PULSE
BAR CLOCK
GND
GEN LOCK IN
+9V
+9V
GND
SC
VD
HD
C. BL
T. BL
CP
SYNC
BFP
-9V
CN5
(BNC)
GENLOCK IN 23a
GND 23b
TP 22
PGM ENC Y 28a
(VIDEO)
PVW ENC Y 41a
PVW ENC R-Y 41b
PGM ENC R-Y 28b
PGM ENC B-Y 29a
GND 29b
PVW ENC B-Y 42a
GND 42b
R309 6.8K
Q53
R310 4.7K
R290 1.8K
Q52
R289 2.2K
R288 2.2K
C143 18P
C144 27P
IC 3
IC 2
IC 2 TC50M001
R192 470K
IC 4 TC40H193
IC 7 TC40H010
IC 5 SCV0592
SYNC LEVEL
Q10
Q11
Q12
Q13
Q14
Q1
Q2
Q3
DL 1
DL 2
TP 12
PVW SYNC
R203 200K
CBM 1 VIDEO AMP
CBM3 VIDEO AMP
Q15
Q21
Q22
Q35
Q36
NTSC only
Y (Y/C) LEVEL
CHROMA LEVEL
R-Y GAIN
TP14
B-Y C.BAL
R-Y C.BAL
R82 PAL
IC 9 AN614
IC 11 AN614
IC 12
QUADRATURE
Q16
Q17
Q18
Q19
Q20
Q23
Q24
Q25
Q26
Q27
Q28
Q46
Q47
BURST PHASE
TP15
TP11
PVW R-Y GAIN
PVW BURST PHASE
PVW B-Y GAIN
PVW BURST
BURST START
BURST STOP
IC31 78L005
IC13 LM311
IC 14 74HC40102
IC15
IC 16 TC40H004
4.27MHz C.LEVEL
TP19
TP20
X'TAL 4.27M
QAT3001 -010
D7 SVC-321
C75 4.27 LOCK
688 C.E
DIF BAL
Q29
Q30
Q31
Q32
Q33
Q34
IC 17 NJM1496
TP18
D6 HD-3
CBM 4 VIDEO AMP
B.B GAIN
B B3 LEVEL

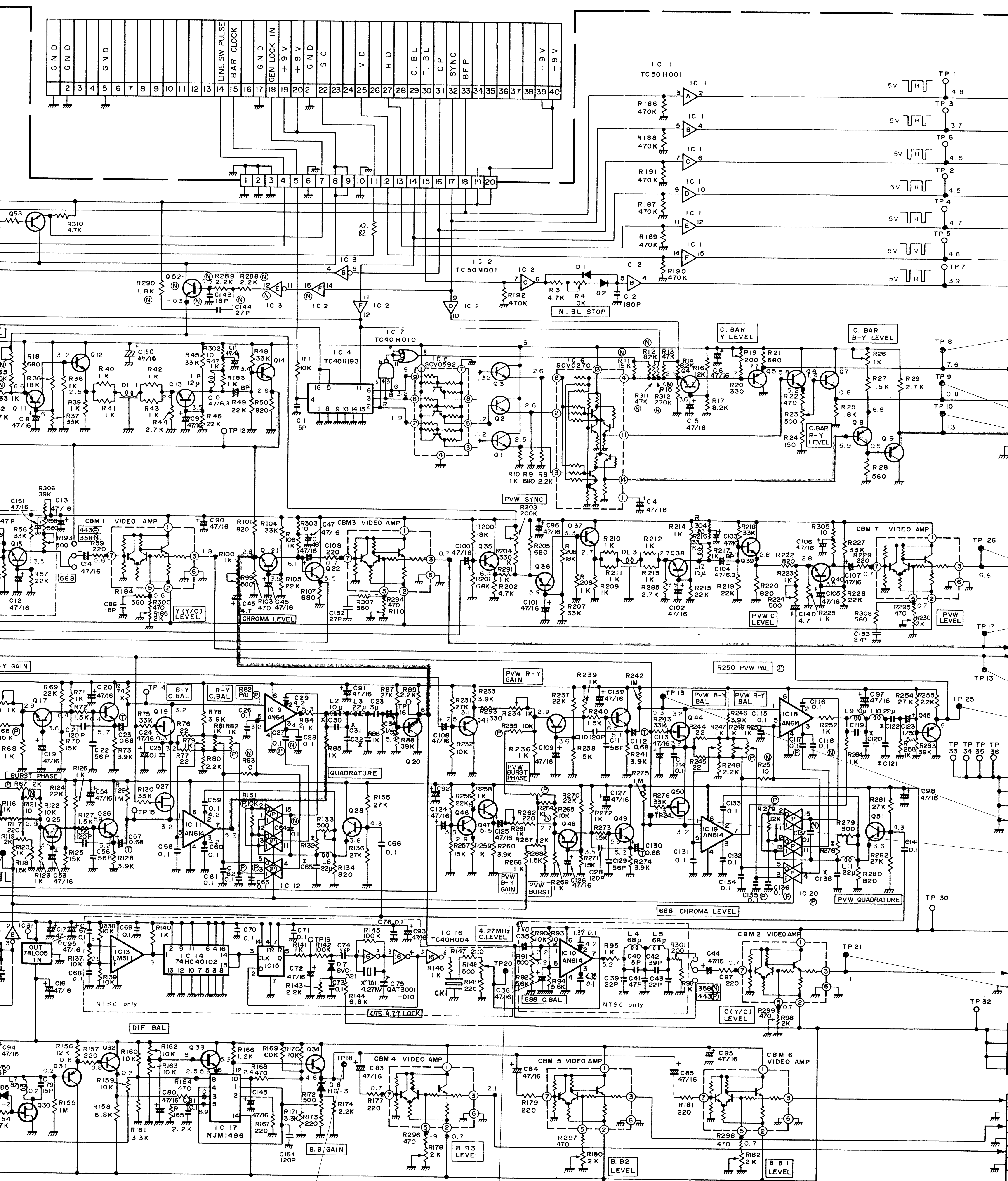

Black Burst

0.43 Vp-p, H-rate

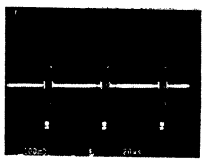

4.27 MHz corrier

1 Vp-p, 200nsec/div

– Main Unit –

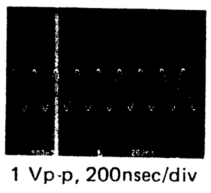

GND
GND
GND
LINE SW PULSE
BAR CLOCK
GND
GEN LOCK IN
+9V
+9V
GND
SC
VD
HD
C.BL
T.BL
CP
SYNC
BFP
-9V
-9V
IC 1 TC50H001
IC 2 TC50W001
IC 3
IC 4 TC40H193
IC 5 SCV0592
IC 6 SCV0270
IC 7 TC40H010
N. BL STOP
C. BAR Y LEVEL
C. BAR B-Y LEVEL
C.BAR R-Y LEVEL
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP 7
TP 8
TP 9
TP 10
TP 12
TP 13
TP 17
TP 21
TP 24
TP 25
TP 26
TP 30
TP 32
CBM 1 VIDEO AMP
CBM 3 VIDEO AMP
CBM 7 VIDEO AMP
CBM 2 VIDEO AMP
CBM 4 VIDEO AMP
CBM 5 VIDEO AMP
CBM 6 VIDEO AMP
PVW SYNC
Y (Y/C) LEVEL
CHROMA LEVEL
PVW C LEVEL
PVW LEVEL
B-Y GAIN
R-Y GAIN
B-Y C.BAL
R-Y C.BAL
R82 PAL
BURST PHASE
QUADRATURE
IC 9 AN614
IC 11 AN614
IC 12
PVW R-Y GAIN
PVW BURST PHASE
PVW B-Y GAIN
PVW BURST
PVW B-Y BAL
PVW R-Y BAL
R250 PVW PAL
IC 18 AN614
IC 19 AN614
IC 20
PVW QUADRATURE
688 CHROMA LEVEL
IC 13 LM311
IC 14 74HC40102
IC 15
IC 16 TC40H004
IC 31 78L005
NTSC only
4.27MHz C.LEVEL
IC 10 AN614
688 C.BAL
C75 4.27 LOCK
X'TAL 4.27M
QAT3001-010
C (Y/C) LEVEL
DIF BAL
IC 17 NJM1496
B.B GAIN
BB3 LEVEL
B.B2 LEVEL
B.B1 LEVEL

Black Burst



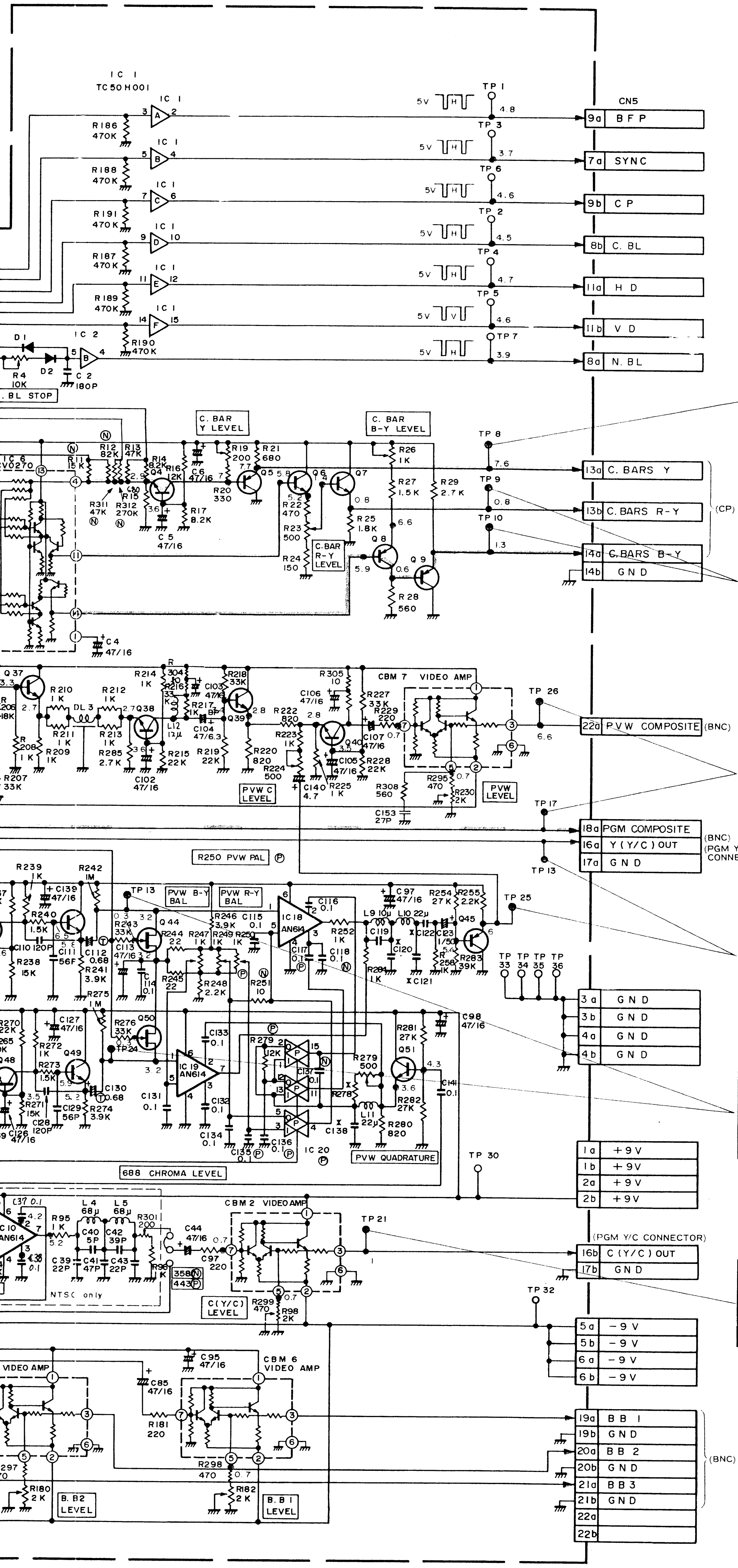
0.43 Vp-p, H-rate

4.27 MHz corrier

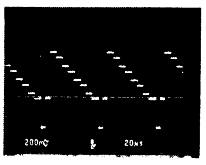


1 Vp-p, 200nsec/div

PNP
NPN
FETs

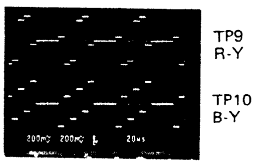

IC 1
TC50H001
CN5
9a BFP
7a SYNC
9b CP
8b C. BL
11a HD
11b VD
8a N. BL
TP 1
TP 3
TP 6
TP 2
TP 4
TP 5
TP 7
5V
C. BL STOP
C. BAR Y LEVEL
C. BAR B-Y LEVEL
C. BAR R-Y LEVEL
13a C. BARS Y
13b C. BARS R-Y
14a C. BARS B-Y
14b GND
(CP)
TP 8
TP 9
TP 10
CBM 7 VIDEO AMP
TP 26
22a PVW COMPOSITE
(BNC)
PVW C LEVEL
PVW LEVEL
TP 17
18a PGM COMPOSITE
16a Y (Y/C) OUT
17a GND
(BNC)
(PGM Y/C CONNECTOR)
TP 13
R250 PVW PAL Ⓟ
PVW B-Y BAL
PVW R-Y BAL
IC18 AN614
IC19 AN614
IC 20
TP 25
TP 33 34 35 36
3a GND
3b GND
4a GND
4b GND
TP24
PVW QUADRATURE
688 CHROMA LEVEL
TP 30
1a +9V
1b +9V
2a +9V
2b +9V
CBM 2 VIDEO AMP
TP 21
(PGM Y/C CONNECTOR)
16b C (Y/C) OUT
17b GND
NTSC only
358Ⓝ
443Ⓟ
C (Y/C) LEVEL
TP 32
5a -9V
5b -9V
6a -9V
6b -9V
VIDEO AMP
CBM 6 VIDEO AMP
19a BB 1
19b GND
20a BB 2
20b GND
21a BB 3
21b GND
22a
22b
(BNC)
B. B2 LEVEL
B. B1 LEVEL

COLOR BARS Y



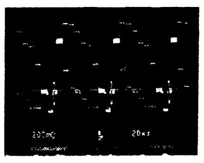
0.82 Vp-p, H-rate

COLOR BARS



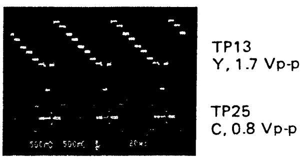
0.525 Vp-p, H-rate

COLOR BARS



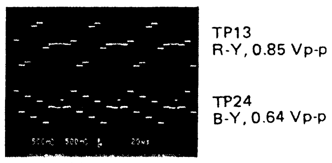
1 Vp-p, H-rate

COLOR BARS



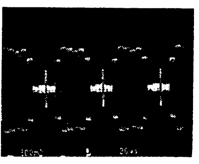
H-rate

COLOR BARS



H-rate

COLOR BARS



1.3 Vp-p, H-rate

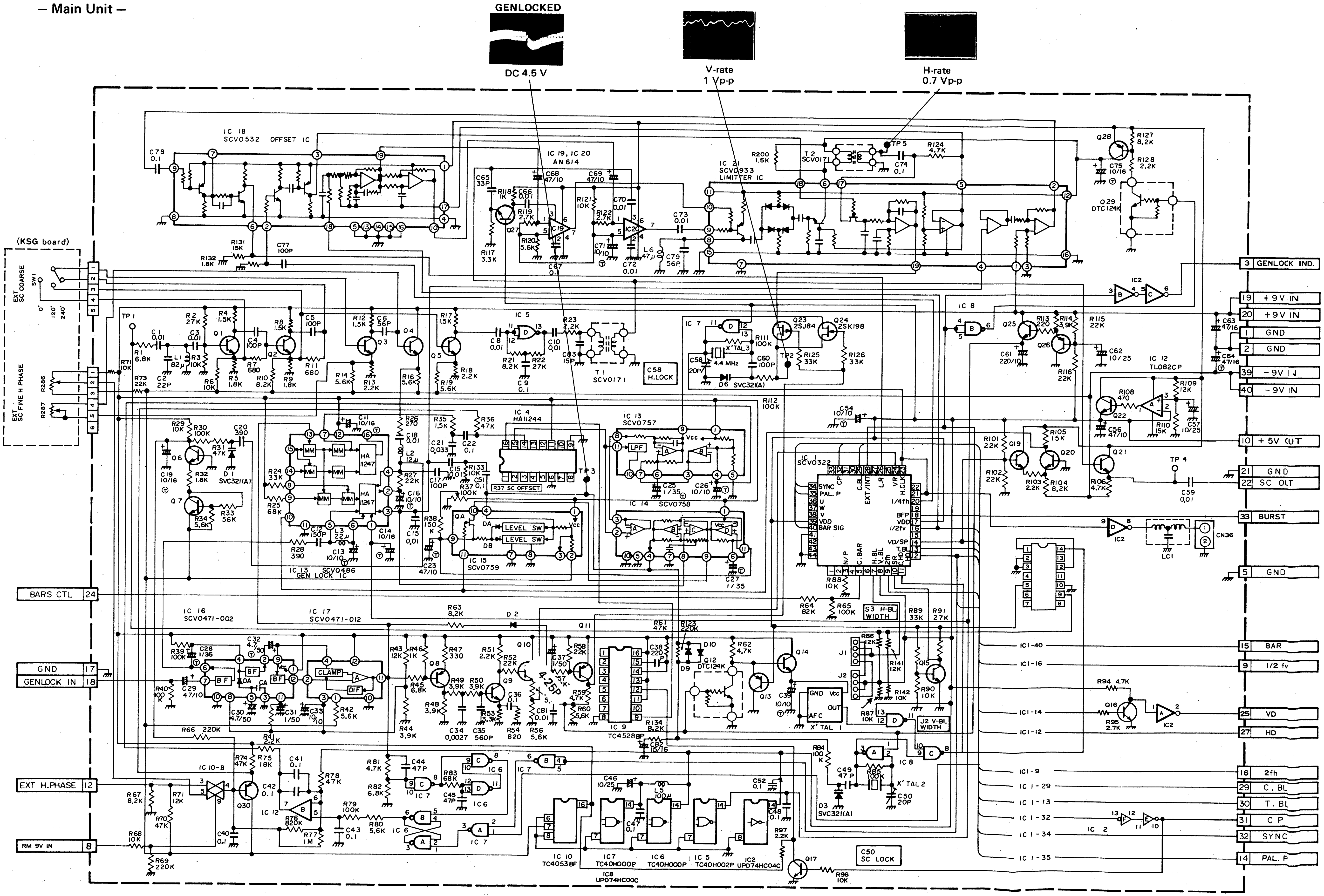
REMARKS

Parts indicated	NTSC	PAL
Ⓝ mark	ALIVE	OPEN
Ⓟ mark	OPEN	ALIVE
* mark		
C33	150P	120P
C30	56P	39P
C31	100P	33P
C32	100P	18P
C65	150P	120P
C119	56P	39P
C120	100P	33P
C121	100P	18P
C122	150P	120P
C138	150P	120P
R132	390	120
R278	390	120

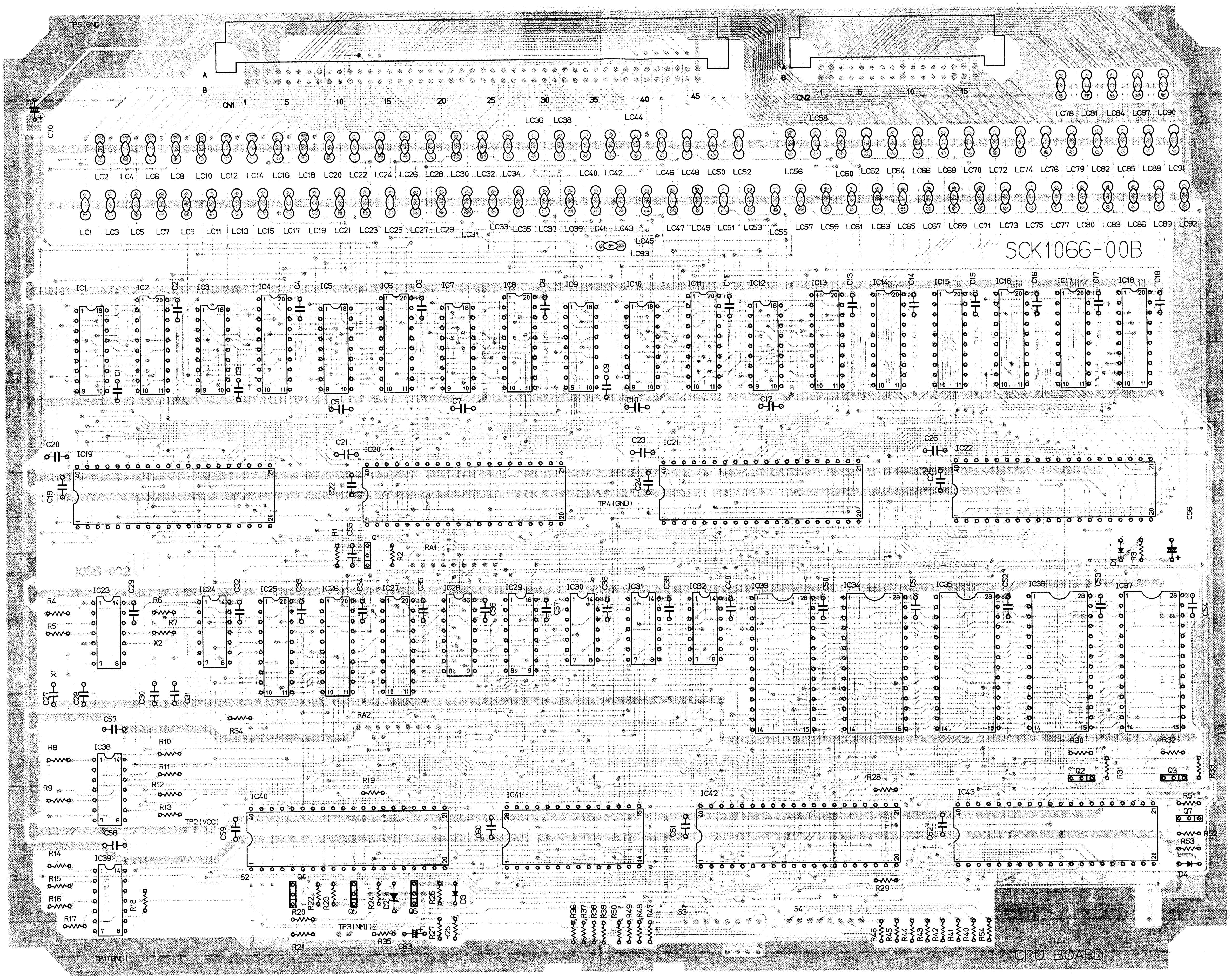
PNP Transistors : 2SA564
NPN Transistors : 2SC1685
FETs : 2SK163

6.24-P SG BOARD SCHEMATIC DIAGRAM (PAL)

– Main Unit –


GENLOCKED
DC 4.5 V
V-rate
1 Vp-p
H-rate
0.7 Vp-p
(KSG board)
EXT SC COARSE
SW1
0°
120°
240°
EXT SC FINE H PHASE
R286
R287
IC 18 SCV0532 OFFSET IC
IC 19, IC 20 AN614
IC 21 SCV0933 LIMITTER IC
T2 SCV0171
TP 5
R124 4.7K
C74 0.1
Q28
R127 8.2K
R128 2.2K
C75 10/16
Q29 DTC124K
3 GENLOCK IND.
19 +9V IN
20 +9V IN
1 GND
2 GND
39 -9V IN
40 -9V IN
10 +5V OUT
21 GND
22 SC OUT
33 BURST
5 GND
15 BAR
9 1/2 fv
25 VD
27 HD
16 2fh
29 C.BL
30 T.BL
31 CP
32 SYNC
14 PAL.P
BARS CTL 24
GND 17
GENLOCK IN 18
EXT H.PHASE 12
RM 9V IN 8
TP 1
IC 5
T1 SCV0171
C58 H.LOCK
IC 7
Q23 2SJ84
Q24 2SK198
4.4 MHz
X'TAL 3
D6 SVC321(A)
TP2
IC 8
IC 12 TL082CP
IC 4 HA11244
R37 SC OFFSET
TP 3
IC 13 SCV0757
LPF
IC 14 SCV0758
IC 15 SCV0759
LEVEL SW
IC 13 SCV0486 GEN LOCK IC
HA 11247
MM
IC 1 SCV0322
SYNC
PAL.P
BAR SIG
VDD
1/4fh
BFP
1/2fv
VD/SP
T.BL
TP 4
C59 0.01
IC2
CN36
LC1
S3 H-BL WIDTH
IC 16 SCV0471-002
IC 17 SCV0471-012
BF
CLAMP
DIF
D 2
Q11
4.25P
IC 9 TC4528BP
D10
Q12 DTC124K
Q13
Q14
Q15
J1
J2
GND Vcc
AFC
OUT
X'TAL 1
J2 V-BL WIDTH
R94 4.7K
Q16
IC1-40
IC1-16
IC1-14
IC1-12
IC1-9
IC1-29
IC1-13
IC1-32
IC1-34
IC1-35
IC 10-B
Q30
IC 12
IC 6
IC 7
IC 8
X'TAL 2
C50 20P
D3 SVC321(A)
IC 10 TC4053BF
IC7 TC40H000P
IC6 TC40H000P
IC 5 TC40H002P
IC2 UPD74HC04C
IC8 UPD74HC00C
Q17
R96 10K
C50 SC LOCK

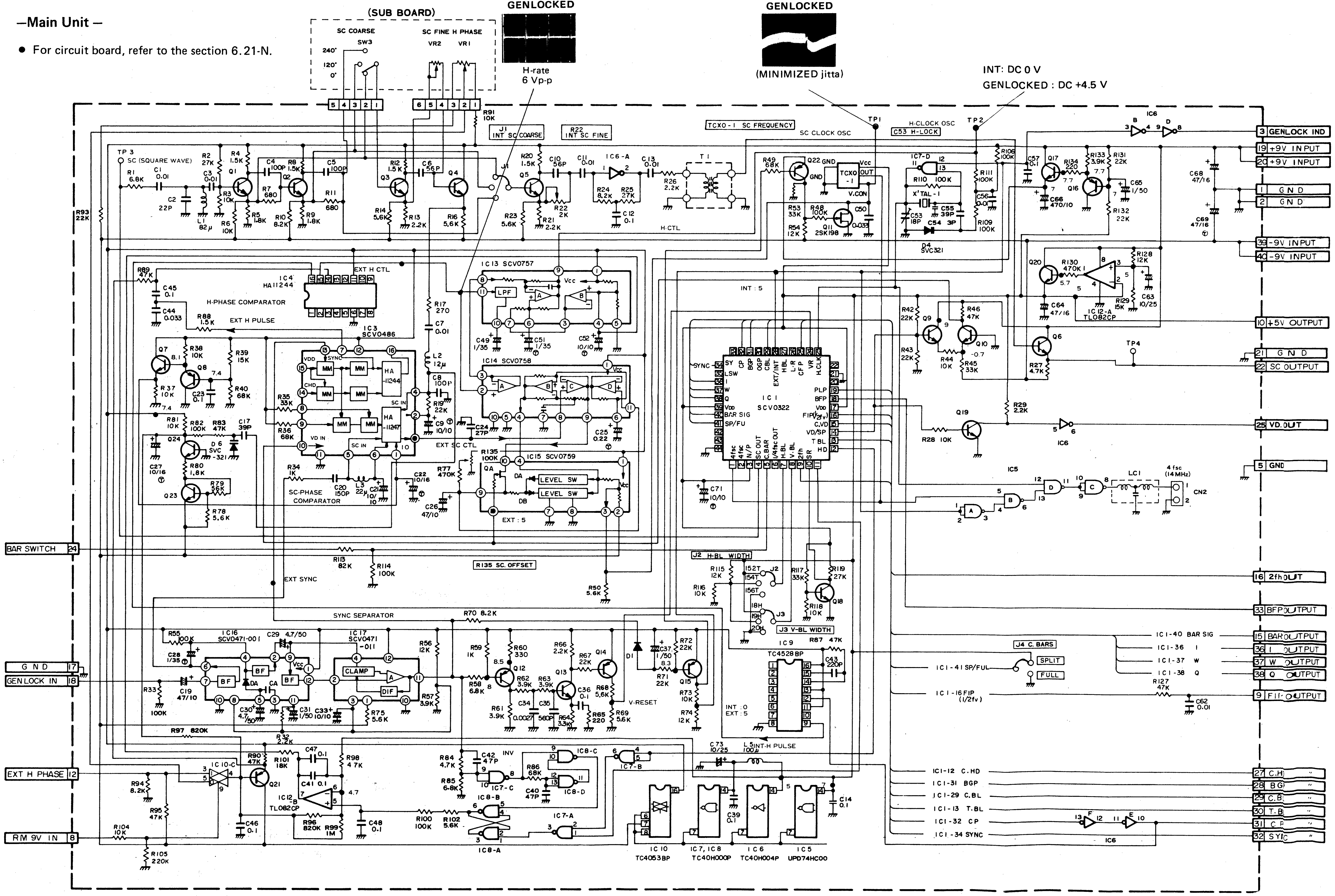
6.25 CPU CIRCUIT BOARD (Parts side view) — Main Unit —


TP5(GND)
CN1
CN2
A
B
SCK1066-00B
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
TP4(GND)
RA1
Q1
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
IC36
IC37
X1
X2
RA2
IC38
IC39
IC40
IC41
IC42
IC43
TP2(VCC)
TP3(NMI)
TP1(GND)
Q2
Q3
Q4
Q5
Q6
Q7
D1
D2
D3
D4
S2
S3
S4
CPU BOARD

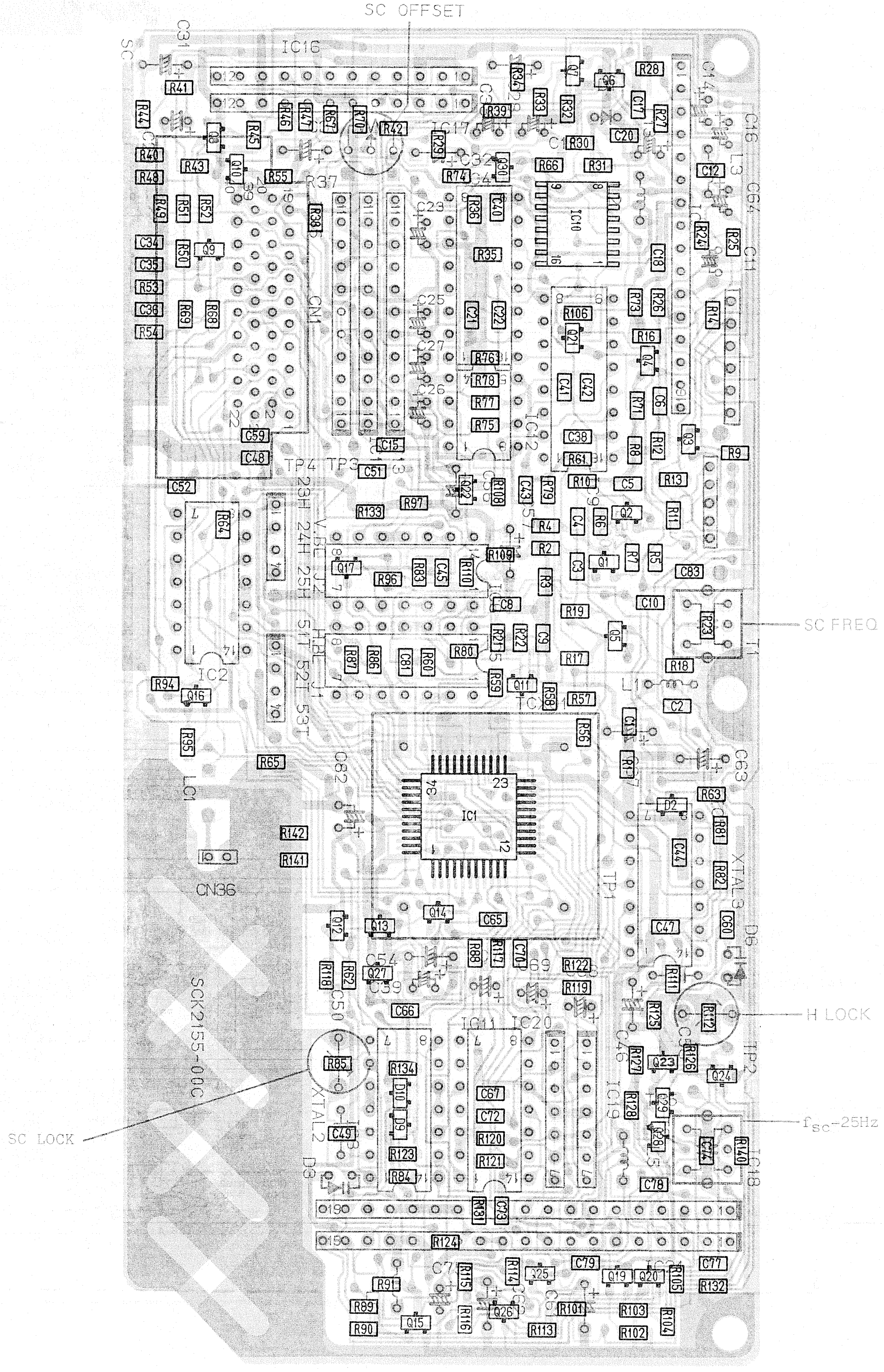
6.24-N SG BOARD SCHEMATIC DIAGRAM (NTSC)

—Main Unit—

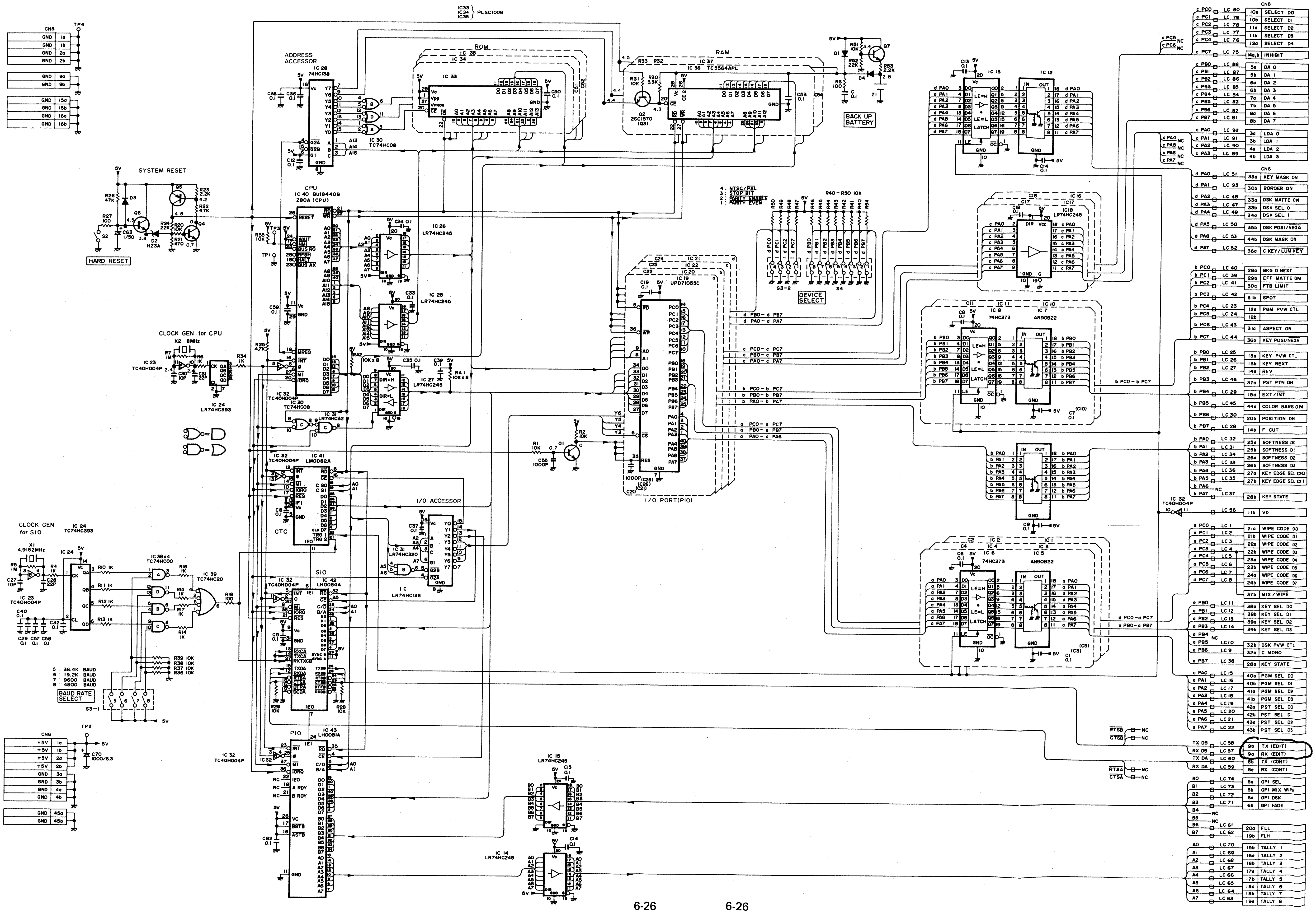
- For circuit board, refer to the section 6.21-N.


(SUB BOARD)
SC COARSE
SW3
240°
120°
0°
SC FINE H PHASE
VR2
VR1
GENLOCKED
H-rate
6 Vp-p
GENLOCKED
(MINIMIZED jitta)
INT: DC 0 V
GENLOCKED : DC +4.5 V
TP 3
SC (SQUARE WAVE)
J1 INT SC COARSE
R22 INT SC FINE
TCXO-1 SC FREQUENCY
SC CLOCK OSC
TP1
H-CLOCK OSC
C53 H-LOCK
TP2
H-CTL
IC4 HA11244
H-PHASE COMPARATOR
EXT H CTL
EXT H PULSE
IC3 SCV0486
IC13 SCV0757
IC14 SCV0758
IC15 SCV0759
LEVEL SW
SC-PHASE COMPARATOR
EXT SC CTL
EXT : 5
INT : 5
IC1 SCV0322
IC12-A TL082CP
IC5
LC1
4 fsc (14 MHz)
CN2
R135 SC. OFFSET
EXT SYNC
SYNC SEPARATOR
IC16 SCV0471-001
IC17 SCV0471-011
CLAMP
DIF
J2 H-BL WIDTH
J3 V-BL WIDTH
IC9 TC4528BP
V-RESET
INT : 0
EXT : 5
J4 C. BARS
SPLIT
FULL
IC1-40 BAR SIG
IC1-36 I
IC1-37 W
IC1-38 Q
IC1-41 SP/FUL
IC1-16 FIP (1/2fv)
INT-H PULSE
IC1-12 C.HD
IC1-31 BGP
IC1-29 C.BL
IC1-13 T.BL
IC1-32 CP
IC1-34 SYNC
IC6
IC10-C
IC12-B TL082CP
IC8-A
IC8-B
IC8-C
IC8-D
IC7-A
IC7-B
IC7-C
IC7-D
INV
IC10 TC4053BP
IC7, IC8 TC40H000P
IC6 TC40H004P
IC5 UPD74HC00
BAR SWITCH 24
GND 17
GEN LOCK IN 18
EXT H PHASE 12
RM 9V IN 8
3 GENLOCK IND
19 +9V INPUT
20 +9V INPUT
1 GND
2 GND
39 -9V INPUT
40 -9V INPUT
10 +5V OUTPUT
21 GND
22 SC OUTPUT
TP4
25 VD.OUT
5 GND
16 2fh OUT
33 BFP OUTPUT
15 BAR OUTPUT
36 I OUTPUT
37 W OUTPUT
38 Q OUTPUT
9 FIP OUTPUT
27 C.H
28 BG
29 C.B
30 T.B
31 C.P
32 SYN

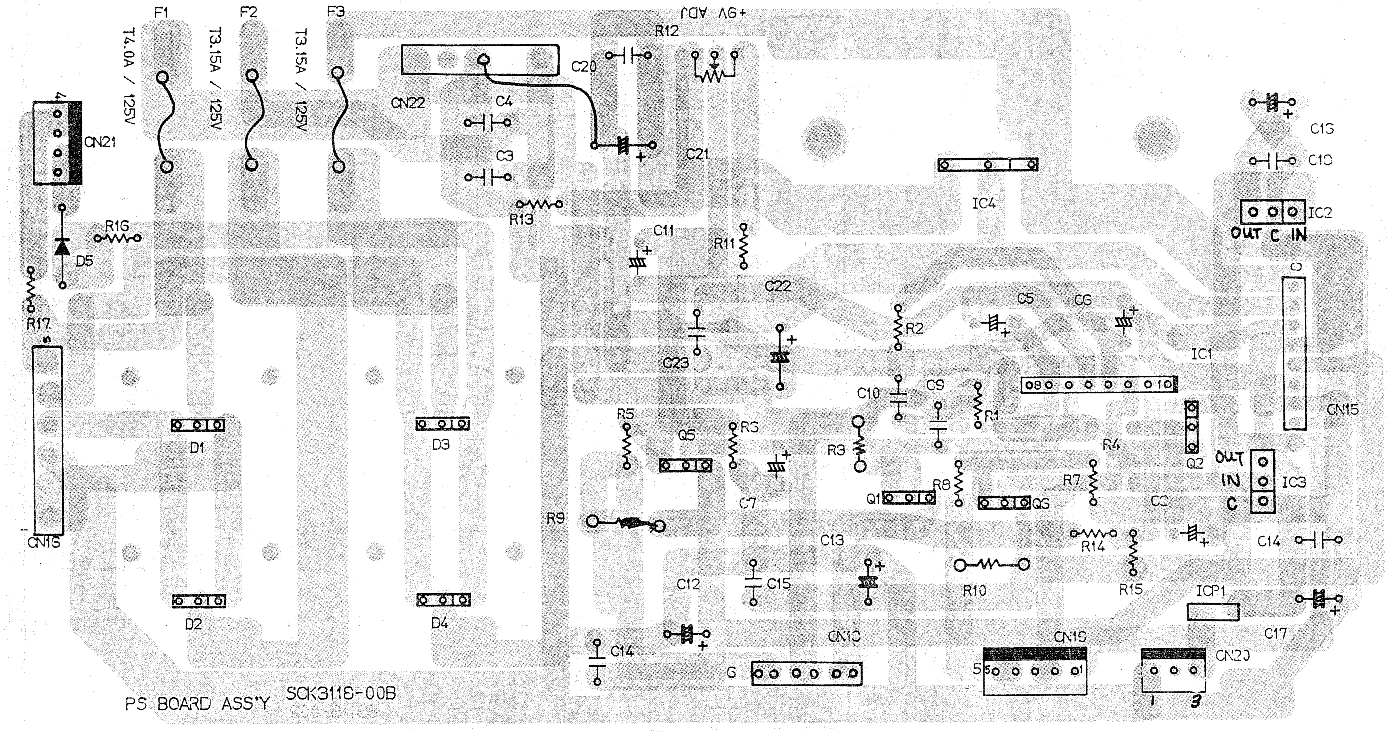
6.21-P SG CIRCUIT BOARD (PAL) – Main Unit –
(Soldered side view)


SC OFFSET
SC FREQ
H LOCK
f_{sc}-25Hz
SC LOCK
IC1
IC2
IC10
IC11
IC12
IC16
IC17
IC18
IC19
IC20
CN1
CN36
TP1
TP2
TP3
TP4
T1
L1
L3
LC1
XTAL2
XTAL3
SCK2155-00C
2.8H
24H
25H
51T
52T
53T
V.BL
H.BL
J1
J2

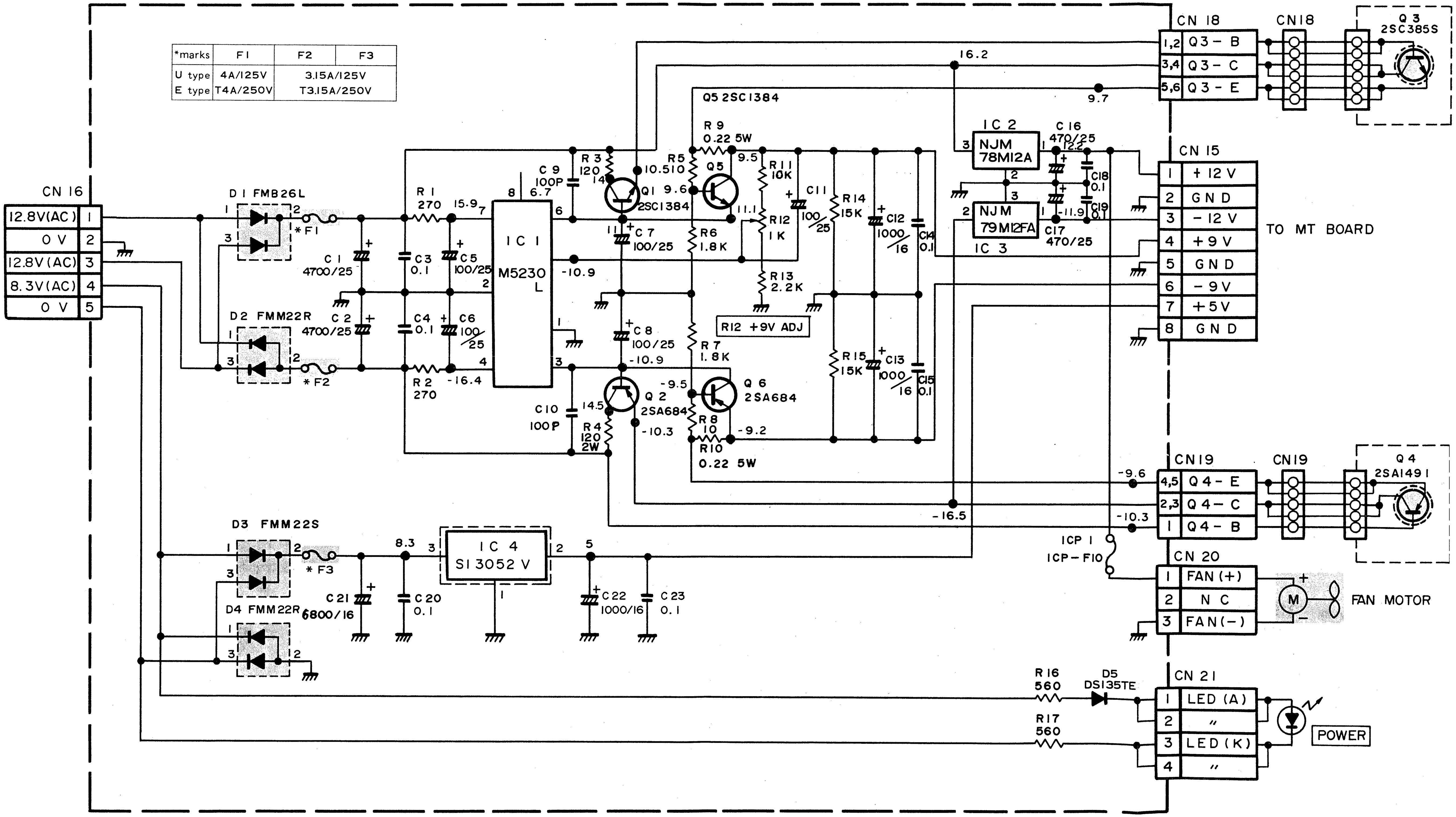
6.26 CPU BOARD SCHEMATIC DIAGRAM – Main Unit –


IC33 IC34 IC35 PLSC1006
ADDRESS ACCESSOR
IC 28 74HC138
IC 30 TC74HC08
ROM
IC 35
IC 34
IC 33
RAM
IC 37
IC 36 TC5564APL
R33 R32
Q2 2SC1570 (Q3)
Q7
BACK UP BATTERY
D1 D4 Z1
IC 13
IC 12
CN8
SELECT D0
SELECT D1
SELECT D2
SELECT D3
SELECT D4
INHIBIT
DA 0
DA 1
DA 2
DA 3
DA 4
DA 5
DA 6
DA 7
LDA 0
LDA 1
LDA 2
LDA 3
CN6
KEY MASK ON
BORDER ON
DSK MATTE ON
DSK SEL 0
DSK SEL 1
DSK POSI/NEGA
DSK MASK ON
C KEY/LUM KEY
BKG D NEXT
EFF MATTE ON
FTB LIMIT
SPOT
PGM PVW CTL
ASPECT ON
KEY POSI/NEGA
KEY PVW CTL
KEY NEXT
REV
PST PTN ON
EXT/INT
COLOR BARS ON
POSITION ON
F CUT
SOFTNESS D0
SOFTNESS D1
SOFTNESS D2
SOFTNESS D3
KEY EDGE SEL D0
KEY EDGE SEL D1
KEY STATE
VD
WIPE CODE D0
WIPE CODE D1
WIPE CODE D2
WIPE CODE D3
WIPE CODE D4
WIPE CODE D5
WIPE CODE D6
WIPE CODE D7
MIX/WIPE
KEY SEL D0
KEY SEL D1
KEY SEL D2
KEY SEL D3
DSK PVW CTL
C MONO
KEY STATE
PGM SEL D0
PGM SEL D1
PGM SEL D2
PGM SEL D3
PST SEL D0
PST SEL D1
PST SEL D2
PST SEL D3
TX (EDIT)
RX (EDIT)
TX (CONT)
RX (CONT)
GPI SEL
GPI MIX WIPE
GPI DSK
GPI FADE
FLL
FLH
TALLY 1
TALLY 2
TALLY 3
TALLY 4
TALLY 5
TALLY 6
TALLY 7
TALLY 8
RTSB CTSB RTSA CTSA NC
SYSTEM RESET
HARD RESET
Q5 Q6 Q4 D2 HZ3A D3
CPU
IC 40 BU18440B Z80A (CPU)
IC 26 LR74HC245
IC 25 LR74HC245
IC 27 LR74HC245
RA1 10K×8
RA2 10K×8
CLOCK GEN. for CPU
X2 8MHz
IC 23 TC40H004P
IC 24 LR74HC393
IC 32 TC40H004P
IC 30 TC74HC08
IC 31 LR74HC32
IC 41 LH0082A
CTC
I/O ACCESSOR
IC 31 LR74HC320
IC LR74HC138
IC 21 IC 22 IC 20 IC 19 UPD71055C
C24 C25 C22
I/O PORT (PIO)
Q1
4 : NTSC/PAL
3 : STOP BIT
2 : PARITY ENABLE
1 : PARITY EVEN
R40 – R50 10K
S3-2 S4
DEVICE SELECT
IC 16 IC 17 IC 18 LR74HC245
IC 11 IC 10 IC 8 74HC373 IC 7 AN90B22
IC 2 IC 1 IC 4 IC 6 74HC373 IC 3 IC 5 AN90B22
LE=H LE=L LATCH
CLOCK GEN for SIO
IC 24 TC74HC393
X1 4.9152MHz
IC 23 TC40H004P
IC 38×4 TC74HC00
IC 39 TC74HC20
5 : 38.4K BAUD
6 : 19.2K BAUD
7 : 9600 BAUD
8 : 4800 BAUD
BAUD RATE SELECT
S3-1
SIO
IC 42 LH0084A
PIO
IC 43 LH0081A
IC 15 LR74HC245
IC 14 LR74HC245
TP1 TP2 TP4 TP5
C70 1000/6.3
+5V GND

6.27 PS CIRCUIT BOARD (Soldered side view) — Main Unit —


F1
F2
F3
T4.0A / 125V
T3.15A / 125V
T3.15A / 125V
+9V ADJ
R12
C20
CN22
C4
C3
C21
CN21
4
R16
D5
R17
R13
C11
R11
IC4
C13
C10
IC2
OUT C IN
C22
C5
C6
R2
C23
IC1
C10
C9
R1
CN15
R5
Q5
R3
R3
R4
Q2
OUT
IN
C
IC3
D1
D3
CN16
C7
Q1
R8
R7
Q6
C2
R9
C13
R14
C14
R15
C12
C15
R10
ICP1
D2
D4
C14
CN18
CN19
C17
CN20
G
5
1
1
3
PS BOARD ASS'Y SCK3118-00B

6.28 PS BOARD SCHEMATIC DIAGRAM — Main Unit —



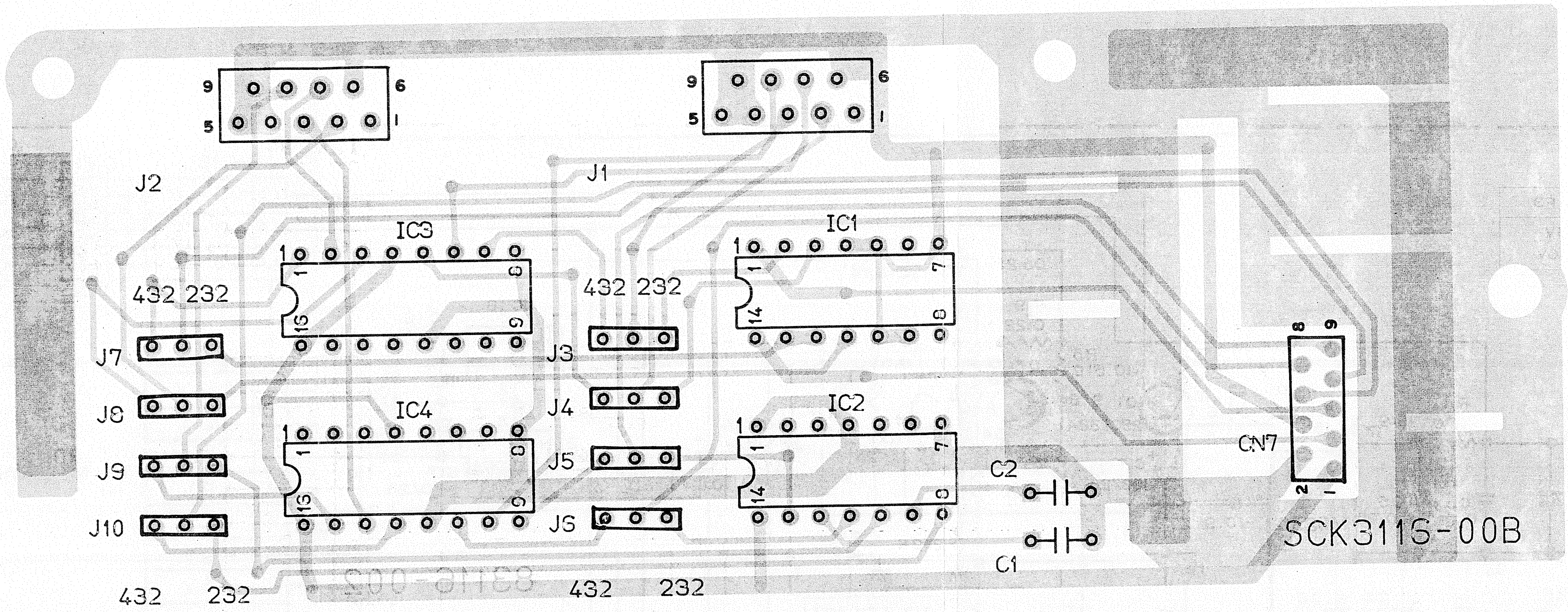
*marks	F1	F2	F3
U type	4A/125V	3.15A/125V	
E type	T4A/250V	T3.15A/250V	

CN 16
12.8V(AC) 1
0 V 2
12.8V(AC) 3
8.3V(AC) 4
0 V 5
D1 FMB26L
D2 FMM22R
D3 FMM22S
D4 FMM22R
*F1
*F2
*F3
C1 4700/25
C2 4700/25
C3 0.1
C4 0.1
C5 100/25
C6 100/25
R1 270
R2 270
15.9
-16.4
IC 1 M5230 L
C9 100P
6.7
-10.9
R3 120
14
Q1 2SC1384
10.510
9.6
C7 100/25
11.1
C8 100/25
-10.9
Q2 2SA684
14.5
-10.3
C10 100P
R4 120 2W
Q5 2SC1384
R5
R9 0.22 5W
9.5
R6 1.8K
R7 1.8K
R11 10K
R12 1K
R13 2.2K
R12 +9V ADJ
C11 100/25
R14 15K
R15 15K
C12 1000/16
C13 1000/16
C14 0.1
C15 0.1
Q6 2SA684
-9.5
R8 10
R10 0.22 5W
-9.2
16.2
9.7
IC 2 NJM 78M12A
IC 3 NJM 79M12FA
C16 470/25
C17 470/25
C18 0.1
C19 0.1
12.2
-11.9
CN 18
1,2 Q3 - B
3,4 Q3 - C
5,6 Q3 - E
CN18
Q3 2SC385S
CN 15
1 +12V
2 GND
3 -12V
4 +9V
5 GND
6 -9V
7 +5V
8 GND
TO MT BOARD
CN19
4,5 Q4 - E
2,3 Q4 - C
1 Q4 - B
CN19
Q4 2SA1491
-9.6
-16.5
-10.3
ICP 1 ICP-F10
CN 20
1 FAN (+)
2 N C
3 FAN (-)
M
FAN MOTOR
IC 4 SI 3052 V
8.3
5
C20 0.1
C21 6800/16
C22 1000/16
C23 0.1
R16 560
R17 560
D5 DS135TE
CN 21
1 LED (A)
2 "
3 LED (K)
4 "
POWER

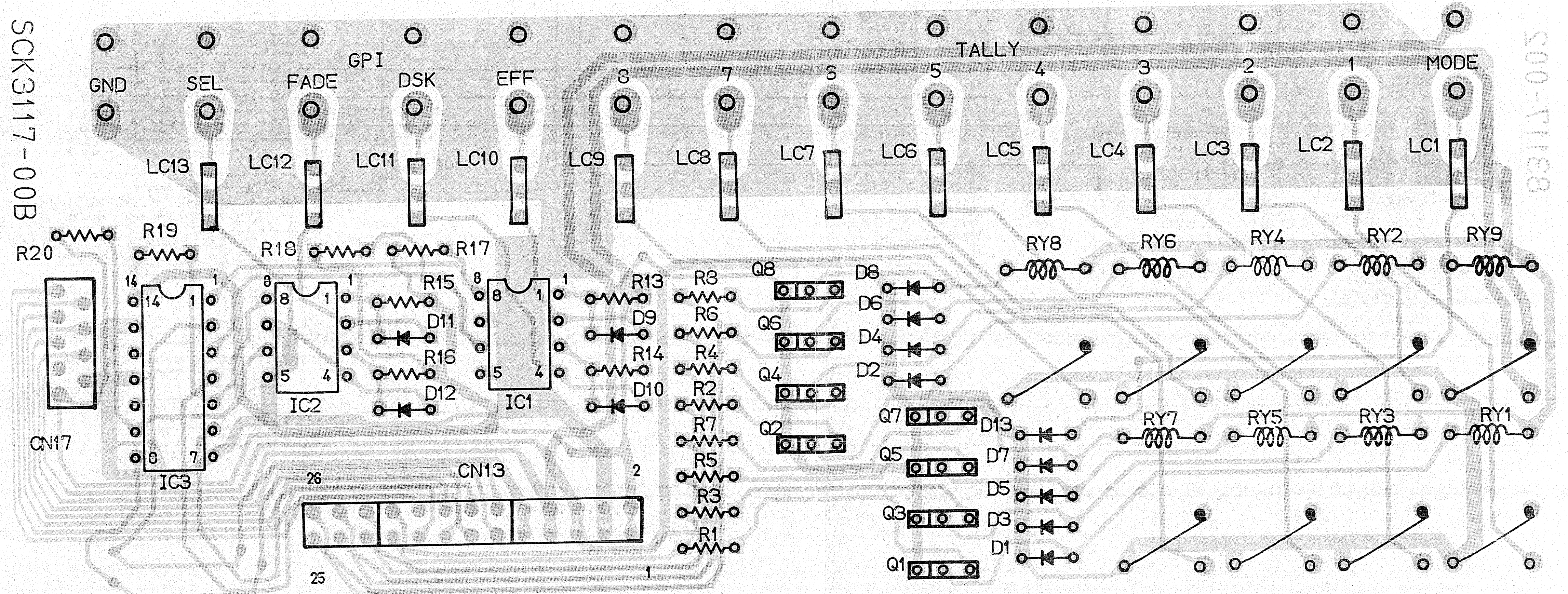
6.29 RM/GPI CIRCUIT BOARD (Soldered side view)

— Main Unit —

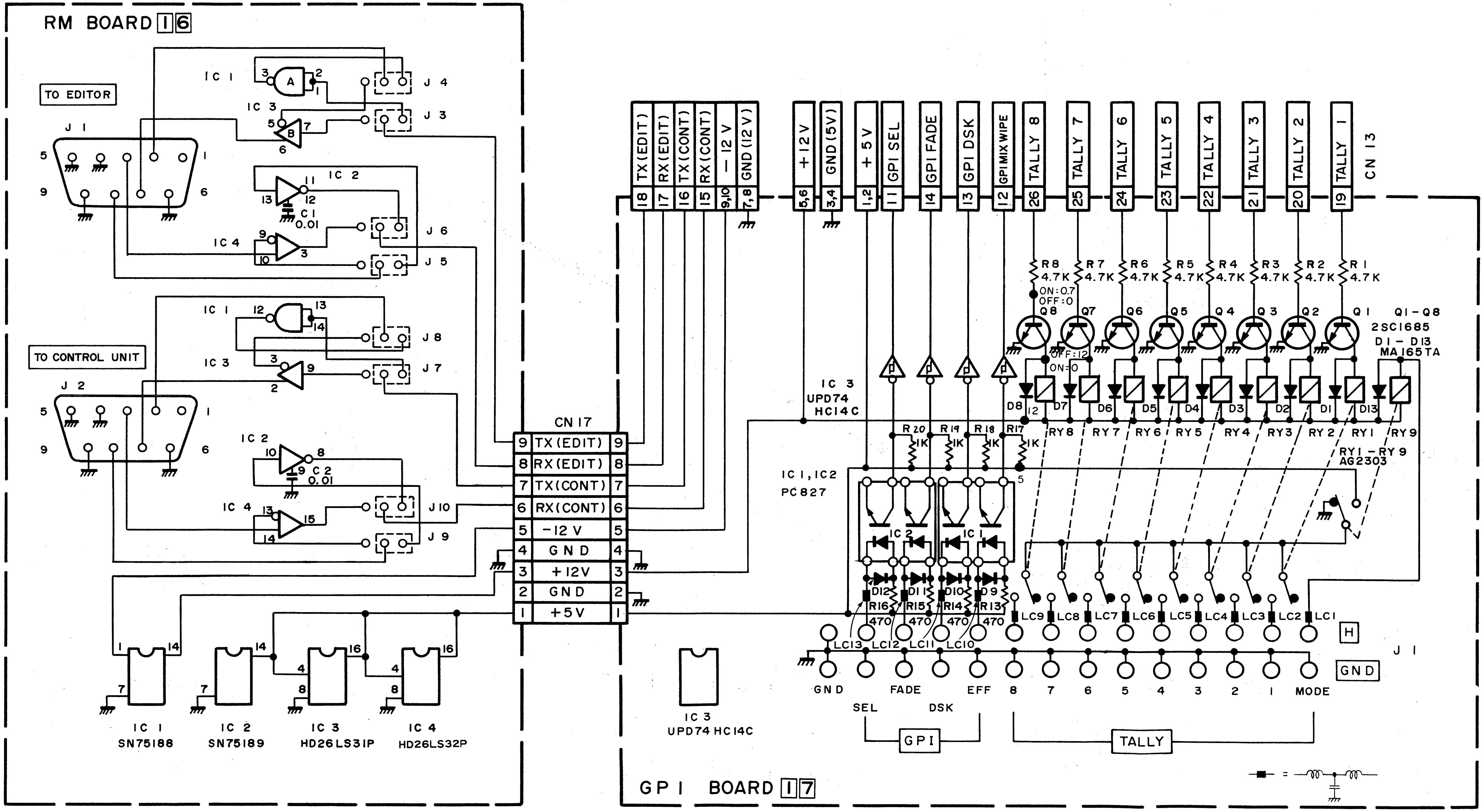
- RM board


9
6
5
1
J2
J1
IC3
IC1
432 232
J7
J8
J9
J10
J3
J4
J5
J6
IC4
IC2
C2
C1
CN7
SCK3116-00B
432
232
432
232

- GPI board

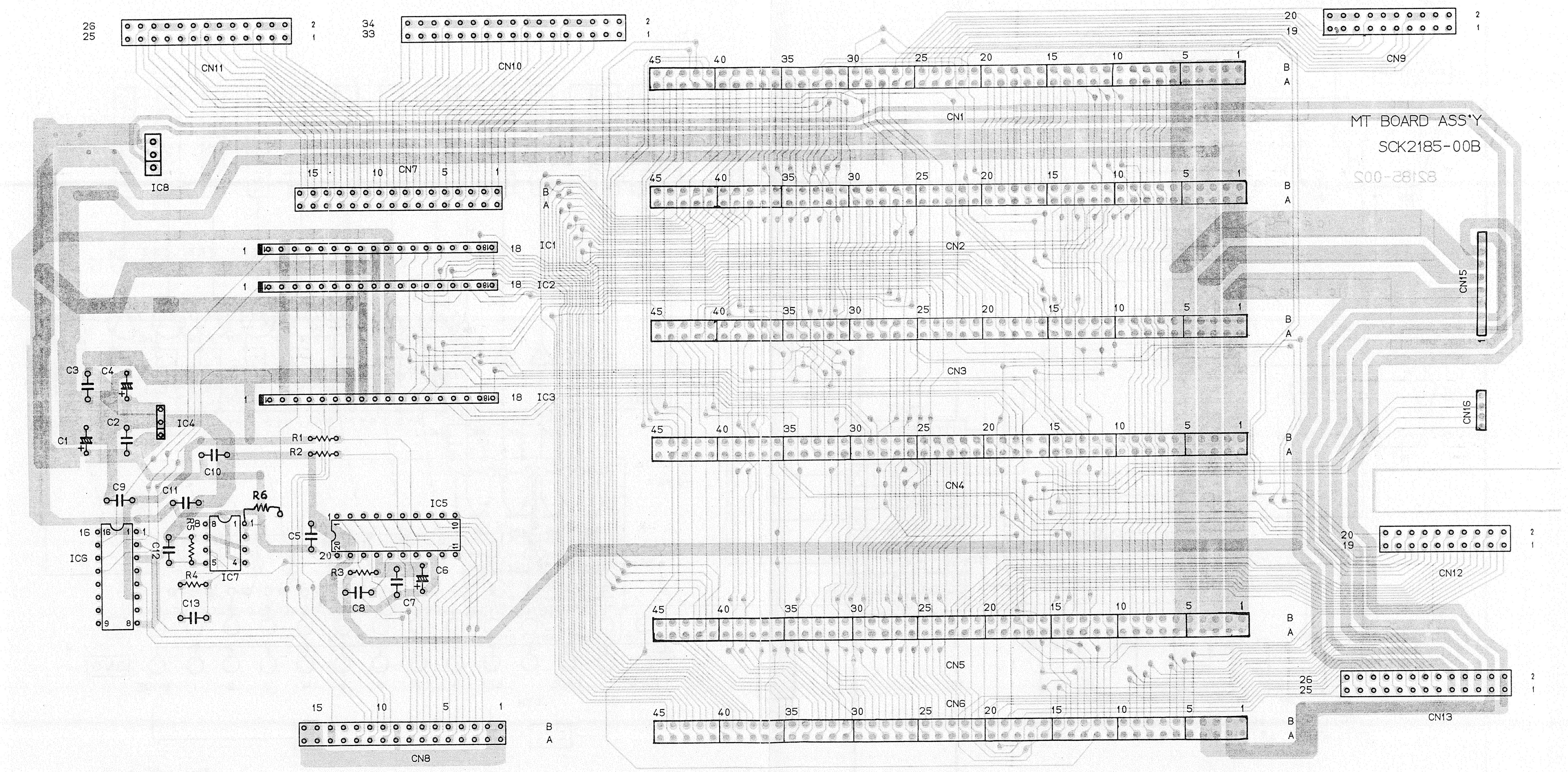

SCK3117-00B
GPI
TALLY
GND
SEL
FADE
DSK
EFF
8
7
6
5
4
3
2
1
MODE
LC13
LC12
LC11
LC10
LC9
LC8
LC7
LC6
LC5
LC4
LC3
LC2
LC1
R20
R19
R18
R17
R15
D11
R16
D12
R13
D9
R14
D10
IC3
IC2
IC1
CN17
R8
R6
R4
R2
R7
R5
R3
R1
Q8
Q6
Q4
Q2
Q7
Q5
Q3
Q1
D8
D6
D4
D2
D13
D7
D5
D3
D1
RY8
RY6
RY4
RY2
RY9
RY7
RY5
RY3
RY1
CN13
26
2
25
1

6.30 RM/GPI BOARD SCHEMATIC DIAGRAM – Main Unit –


RM BOARD 16
TO EDITOR
J 1
IC 1
IC 3
J 4
J 3
IC 2
C1 0.01
IC 4
J 6
J 5
TO CONTROL UNIT
J 2
J 8
J 7
C 2 0.01
J 10
J 9
CN 17
9 TX(EDIT) 9
8 RX(EDIT) 8
7 TX(CONT) 7
6 RX(CONT) 6
5 −12 V 5
4 GND 4
3 +12V 3
2 GND 2
1 +5V 1
IC 1 SN75188
IC 2 SN75189
IC 3 HD26LS31P
IC 4 HD26LS32P
TX(EDIT) 18
RX(EDIT) 17
TX(CONT) 16
RX(CONT) 15
−12 V 9,10
GND(12V) 7,8
+12V 5,6
GND(5V) 3,4
+5V 1,2
GPI SEL 11
GPI FADE 14
GPI DSK 13
GPI MIX WIPE 12
TALLY 8 26
TALLY 7 25
TALLY 6 24
TALLY 5 23
TALLY 4 22
TALLY 3 21
TALLY 2 20
TALLY 1 19
CN 13
R8 4.7K
R7 4.7K
R6 4.7K
R5 4.7K
R4 4.7K
R3 4.7K
R2 4.7K
R1 4.7K
ON:0.7
OFF:0
Q8 Q7 Q6 Q5 Q4 Q3 Q2 Q1
Q1-Q8 2SC1685
D1 - D13 MA165TA
OFF:12
ON:0
IC 3 UPD74 HC14C
D8 D7 D6 D5 D4 D3 D2 D1 D13
RY8 RY7 RY6 RY5 RY4 RY3 RY2 RY1 RY9
RY1 - RY9 AG2303
R20 1K R19 1K R18 1K R17 1K
IC1, IC2 PC827
IC 2 IC 1
D12 D11 D10 D9
R16 470 R15 470 R14 470 R13 470
LC9 LC8 LC7 LC6 LC5 LC4 LC3 LC2 LC1
LC13 LC12 LC11 LC10
H
GND
J 1
GND FADE EFF 8 7 6 5 4 3 2 1 MODE
SEL DSK
GPI
TALLY
IC 3 UPD74 HC14C
GPI BOARD 17

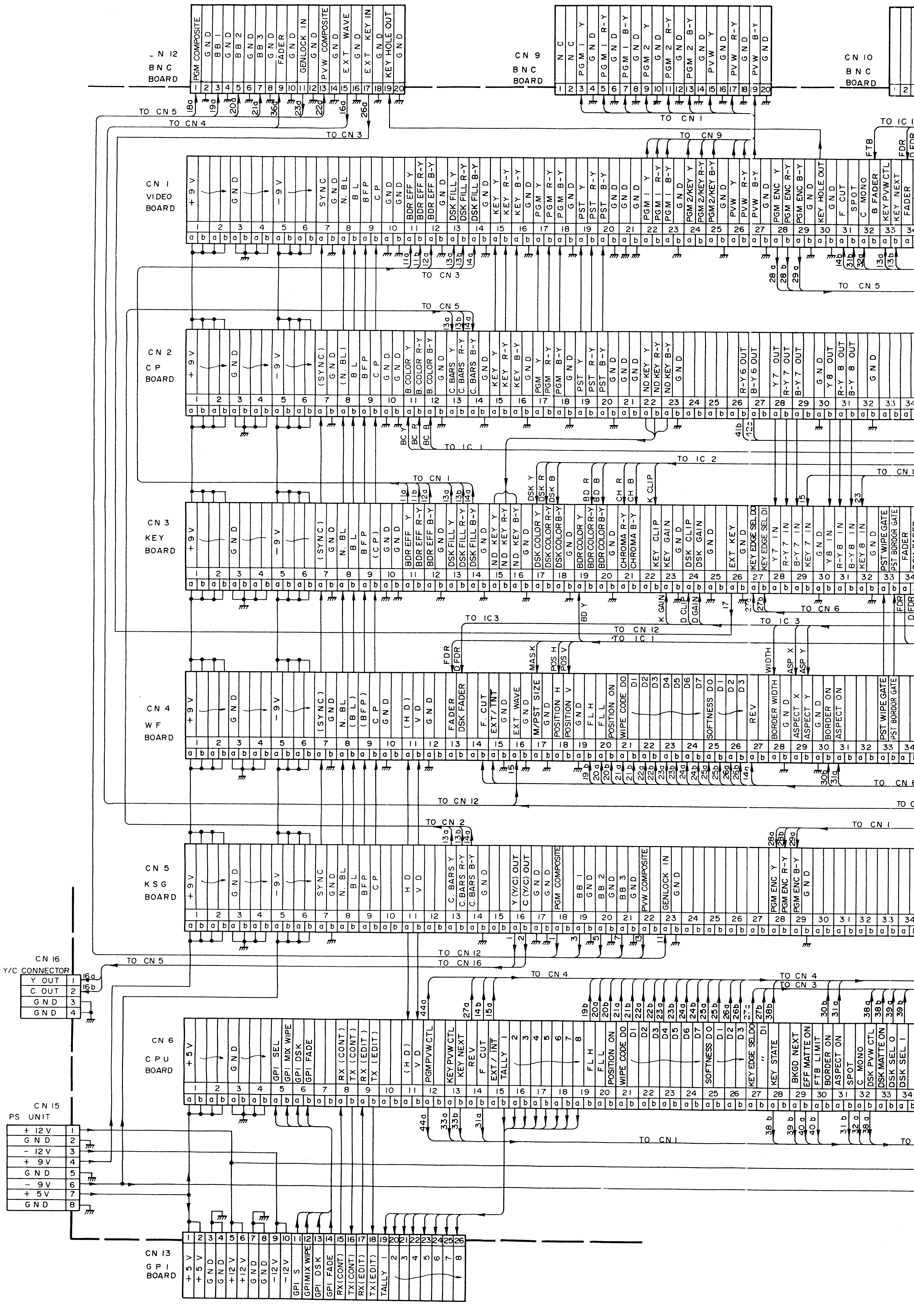
6.31 MT CIRCUIT BOARD (Soldered side view)

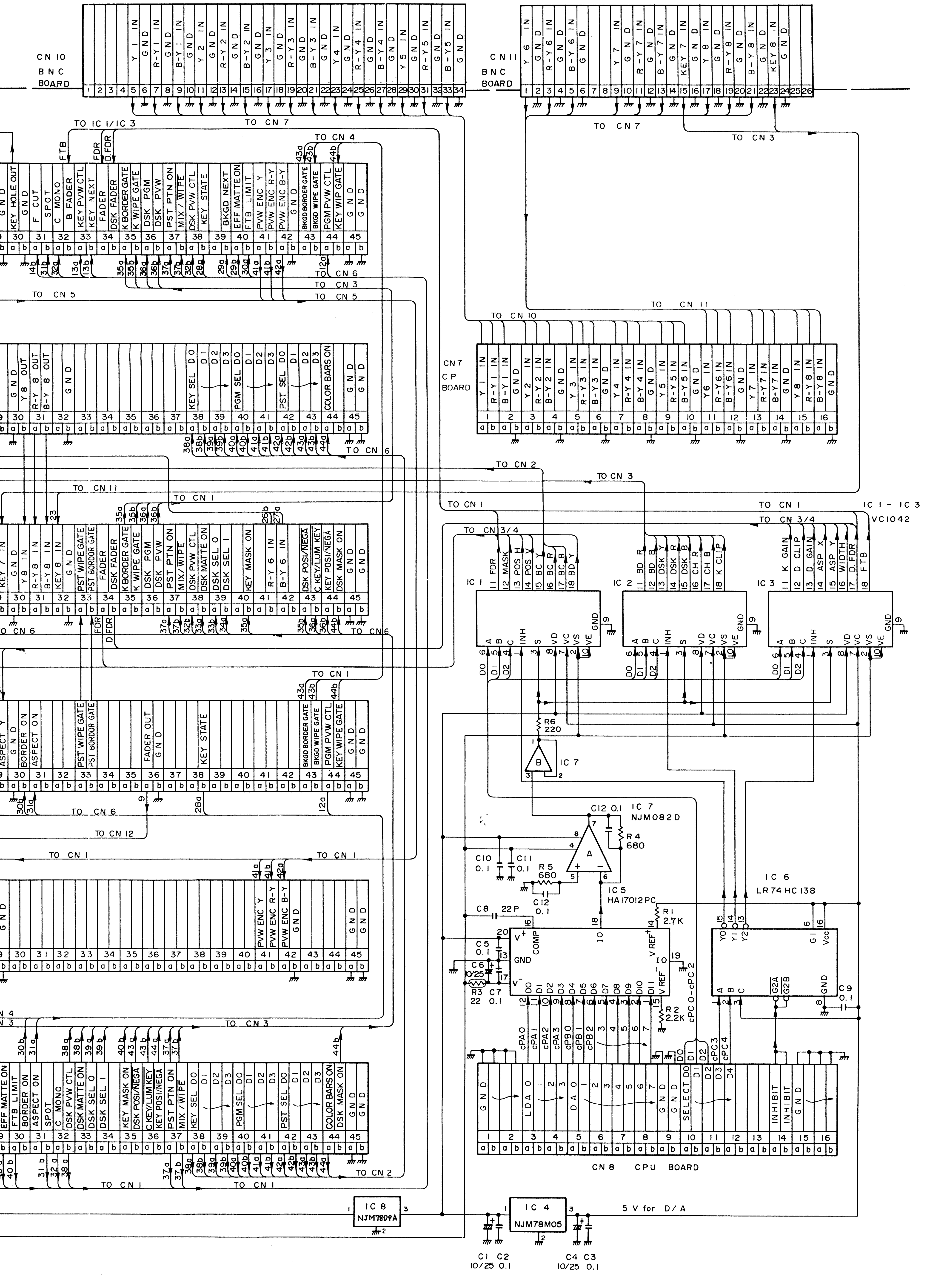
— Main Unit —



MT BOARD ASS'Y
SCK2185-00B
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN13
CN15
CN16
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
R1
R2
R3
R4
R5
R6

6.32 MT BOARD SCHEMATIC DIAGRAM


CN 12
BNC BOARD
PGM COMPOSITE
GND
BB I
GND
BB 2
GND
BB 3
GND
FADER
GND
GENLOCK IN
GND
PVW COMPOSITE
GND
EXT WAVE
GND
EXT KEY IN
GND
KEY HOLE OUT
GND
TO CN 5
TO CN 4
TO CN 3
CN 9
BNC BOARD
N C
N C
PGM I Y
GND
PGM I R-Y
GND
PGM I B-Y
GND
PGM 2 Y
GND
PGM 2 R-Y
GND
PGM 2 B-Y
GND
PVW Y
GND
PVW R-Y
GND
PVW B-Y
GND
TO CN I
TO CN 9
CN 10
BNC BOARD
TO IC I
FTB
FDR
CN I
VIDEO BOARD
+9V
GND
-9V
SYNC
GND
N. BL
BL
BFP
CP
GND
GND
BDR EFF Y
BDR EFF R-Y
BDR EFF B-Y
GND
DSK FILL Y
DSK FILL R-Y
DSK FILL B-Y
GND
KEY Y
KEY R-Y
KEY B-Y
GND
PGM Y
PGM R-Y
PGM B-Y
GND
PST Y
PST R-Y
PST B-Y
GND
GND
GND
PGM I Y
PGM I R-Y
PGM I B-Y
GND
PGM 2/KEY Y
PGM 2/KEY R-Y
PGM 2/KEY B-Y
GND
PVW Y
PVW R-Y
PVW B-Y
GND
PGM ENC Y
PGM ENC R-Y
PGM ENC B-Y
GND
KEY HOLE OUT
GND
F CUT
SPOT
C MONO
B FADER
KEY PVW CTL
KEY NEXT
FADER
TO CN 3
TO CN 5
TO CN 5
CN 2
CP BOARD
+9V
GND
-9V
(SYNC)
GND
(N. BL)
BL
BFP
CP
GND
GND
B.COLOR Y
B.COLOR R-Y
B.COLOR B-Y
C.BARS Y
C.BARS R-Y
C.BARS B-Y
GND
KEY Y
KEY R-Y
KEY B-Y
GND
PGM Y
PGM R-Y
PGM B-Y
GND
PST Y
PST R-Y
PST B-Y
GND
GND
GND
ND KEY Y
ND KEY R-Y
ND KEY B-Y
GND
R-Y 6 OUT
B-Y 6 OUT
Y 7 OUT
R-Y 7 OUT
B-Y 7 OUT
GND
Y 8 OUT
R-Y 8 OUT
B-Y 8 OUT
GND
BC Y
BC R
BC B
TO IC I
TO IC 2
TO CN I
TO CN I
DSK Y
DSK R
DSK B
BD R
BD B
CH R
CH B
K CLIP
CN 3
KEY BOARD
+9V
GND
-9V
(SYNC)
GND
N. BL
BL
BFP
(CP)
GND
GND
BDR EFF Y
BDR EFF R-Y
BDR EFF B-Y
DSK FILL Y
DSK FILL R-Y
DSK FILL B-Y
GND
ND KEY Y
ND KEY R-Y
ND KEY B-Y
GND
DSK COLOR Y
DSK COLOR R-Y
DSK COLOR B-Y
GND
BDR COLOR Y
BDR COLOR R-Y
BDR COLOR B-Y
GND
CHROMA R-Y
CHROMA B-Y
KEY CLIP
KEY GAIN
DSK CLIP
DSK GAIN
GND
EXT KEY
GND
KEY EDGE SEL DO
KEY EDGE SEL DI
Y 7 IN
R-Y 7 IN
KEY 7 IN
GND
Y 8 IN
R-Y 8 IN
B-Y 8 IN
KEY 8 IN
GND
PST WIPE GATE
PST BORDOR GATE
FADER
BD Y
K GAIN
D CLIP
D GAIN
TO CN 6
TO IC 3
TO IC3
TO CN 12
TO IC I
FDR
FDR
MASK
POS H
POS V
WIDTH
ASP X
ASP Y
CN 4
WF BOARD
+9V
GND
-9V
(SYNC)
GND
N. BL
(BFP)
CP
GND
(HD)
VD
GND
FADER
DSK FADER
F. CUT
EXT/INT
GND
EXT WAVE
GND
M/PST SIZE
GND
POSITION H
POSITION V
GND
FLH
FLL
POSITION ON
WIPE CODE DO
DI
D2
D3
D4
D5
D6
D7
SOFTNESS DO
DI
D2
D3
REV
BORDER WIDTH
GND
ASPECT X
ASPECT Y
GND
BORDER ON
ASPECT ON
PST WIPE GATE
PST BORDOR GATE
TO CN 6
TO CN 12
TO CN 2
TO CN I
CN 5
KSG BOARD
+9V
GND
-9V
SYNC
GND
N. BL
BL
BFP
CP
HD
VD
C. BARS Y
C. BARS R-Y
C. BARS B-Y
GND
Y (Y/C) OUT
C (Y/C) OUT
GND
GND
PGM COMPOSITE
BB I
GND
BB 2
GND
BB 3
GND
PVW COMPOSITE
GENLOCK IN
GND
PGM ENC Y
PGM ENC R-Y
PGM ENC B-Y
GND
TO CN 12
TO CN 16
TO CN 5
CN 16
Y/C CONNECTOR
Y OUT
C OUT
GND
GND
TO CN 4
TO CN 4
TO CN 3
CN 6
CPU BOARD
+5V
GND
GPI SEL
GPI MIX WIPE
GPI DSK
GPI FADE
RX (CONT)
TX (CONT)
RX (EDIT)
TX (EDIT)
(HD)
VD
PGM PVW CTL
KEY PVW CTL
KEY NEXT
REV
F CUT
EXT / INT
TALLY I
FLH
FLL
POSITION ON
WIPE CODE DO
DI
D2
D3
D4
D5
D6
D7
SOFTNESS DO
DI
D2
D3
KEY EDGE SEL DO
DI
KEY STATE
BKGD NEXT
EFF MATTE ON
FTB LIMIT
BORDER ON
ASPECT ON
SPOT
C MONO
PGM PVW CTL
DSK MATTE ON
DSK SEL O
DSK SEL I
TO CN I
CN 15
PS UNIT
+ 12 V
GND
- 12 V
+ 9V
GND
- 9V
+ 5V
GND
CN 13
GPI BOARD
+5V
+5V
GND
GND
+12V
+12V
GND
GND
-12V
-12V
GPI S
GPI MIX WIPE
GPI DSK
GPI FADE
RX (CONT)
TX (CONT)
RX (EDIT)
TX (EDIT)
TALLY I
2
3
4
5
6
7
8


CN 10
BNC
BOARD
Y 1 IN
GND
R-Y1 IN
GND
B-Y1 IN
GND
Y 2 IN
GND
R-Y 2 IN
GND
B-Y 2 IN
GND
Y 3 IN
GND
R-Y 3 IN
GND
B-Y 3 IN
GND
Y4 IN
GND
R-Y 4 IN
GND
B-Y4 IN
GND
Y 5 IN
GND
R-Y5 IN
GND
B-Y5 IN
GND
CN 11
BNC
BOARD
Y 6 IN
GND
R-Y 6 IN
GND
B-Y 6 IN
GND
Y 7 IN
GND
R-Y 7 IN
GND
B-Y 7 IN
KEY 7 IN
Y 8 IN
GND
R-Y 8 IN
GND
B-Y 8 IN
KEY 8 IN
GND
TO CN 7
TO CN 3
TO IC 1/IC 3
TO CN 4
TO CN 5
TO CN 6
TO CN 10
TO CN 11
TO CN 1
TO CN 2
TO CN 3/4
TO CN 12
CN7
CP
BOARD
GND
KEY HOLE OUT
F CUT
SPOT
C MONO
B FADER
KEY PVW CTL
KEY NEXT
FADER
DSK FADER
K BORDER GATE
K WIPE GATE
DSK PGM
DSK PVW
PST PTN ON
MIX / WIPE
DSK PVW CTL
KEY STATE
BKGD NEXT
EFF MATTE ON
FTB LIMIT
PVW ENC Y
PVW ENC R-Y
PVW ENC B-Y
BKGD BORDER GATE
BKGD WIPE GATE
PGM PVW CTL
KEY WIP GATE
FTB
FDR
D.FDR
Y 8 OUT
R-Y 8 OUT
B-Y 8 OUT
KEY SEL D0
PGM SEL D0
PST SEL D0
COLOR BARS ON
KEY 7 IN
Y8 IN
R-Y 8 IN
B-Y 8 IN
KEY 8 IN
PST WIPE GATE
PST BORDOR GATE
DSK MATTE ON
DSK SEL 0
DSK SEL 1
KEY MASK ON
R-Y 6 IN
B-Y 6 IN
DSK POSI/NEGA
C.KEY/LUM.KEY
KEY POSI/NEGA
DSK MASK ON
ASPECT Y
BORDER ON
ASPECT ON
FADER OUT
IC 1 - IC 3
VC1042
IC 1
IC 2
IC 3
FDR
MASK
POS H
POS V
BC Y
BC R
BC B
BD Y
BD R
BD B
DSK Y
DSK R
DSK B
CH R
CH B
K CLIP
K GAIN
D CLIP
D GAIN
ASP X
ASP Y
WIDTH
D.FDR
A
B
C
INH
S
VD
VC
VS
VE
GND
R6
220
IC 7
C12 0.1
IC 7
NJM082D
R 4
680
C10
0.1
C11
0.1
R 5
680
C12
0.1
IC 5
HA17012PC
C8 22P
R1
2.7K
C5
0.1
C6
10/25
R3
22
C7
0.1
V+
COMP
GND
V-
V REF+
V REF-
IO
R2
2.2K
cPC 0-cPC 2
IC 6
LR74HC138
Y0
Y1
Y2
G1
Vcc
G2A
G2B
C 9
0.1
cPA0
cPA1
cPA2
cPA3
cPB0
cPB1
cPB2
cPC3
cPC4
LDA 0
DA 0
SELECT D0
INHIBIT
CN 8 CPU BOARD
IC 8
NJM7809A
IC 4
NJM78M05
5 V for D/A
C1 C2
10/25 0.1
C4 C3
10/25 0.1

SECTION 7
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.
For maximum reliability and performance, all other replacement parts should be identical to those specified.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS – All resistance values are in ohms (Ω).

K : 1 000
M : 1 000 000
CR : Carbon Resistor
Comp. R : Composition Resistor
WR : Wire Wound Resistor
OMR : Oxide Metal Film Resistor
VR : Variable Resistor (Potentiometer)
MFR : Metal Film Resistor
UR : Unframable Resistor
MPR : Metal Plate Resistor
Chip R : Chip Resistor

CAPACITORS – All capacitance values are in μF, unless otherwise indicated.

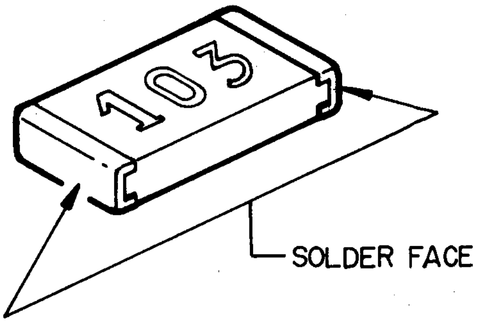
P : μμF
C Cap : Ceramic Capacitor
E Cap : Electrolytic Capacitor
FM Cap : Film Mica Capacitor
MM Cap : Metalized Mylar Capacitor
MP Cap : Metalized Paper Capacitor
MY Cap : Mylar Capacitor
NP Cap : Non-polar Capacitor
PC Cap : Polycarbonate Capacitor
PP Cap : Poly Pro Capacitor
PS Cap : Polystyrol Capacitor
T Cap : Tantalum Capacitor
TR Cap : Trimmer Capacitor

Tolerances of resistors or capacitors are as follows:

M : ± 20 %
K : ± 10 %
J : ± 5 %
G : ± 2 %
F : ± 1 %

STANDARD PART NUMBER CODING

Chip Resistors (Metal Glaze Resistor)



- Resistance values are indicated in code on the side opposite to that facing the PC board. Since resistance values are not indicated in the parts list, use this coding table to identify them.
- Parts are supplied in packs of 5 units.
- Alternative method of replacement is to substitute chip resistors with ordinary carbon resistors type QRD167J.
- Rated wattage is 1/10 W.

NRSA02 J -□□□

1/10 W Chip Resistor Code   Tolerance

Symbol	Tolerance	
J	± 5 %	⇨ Standard
K	± 10 %	
M	± 20 %	

Resistance Value

Examples: R47 ..... 0.47 Ω
4R7 ..... 4.7 Ω
470 ..... 47 Ω
471 ..... 470 Ω
472 ..... 4.7 kΩ
473 ..... 47 kΩ
474 ..... 470 kΩ
475 ..... 4.7 MΩ

7.1 CPS board assembly 01

01☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC1	TC74HC42P	IC	TOSHIBA
IC2	BA6212	IC	ROHM
IC3	BA6212	IC	ROHM
IC4	TC74HC42P	IC	TOSHIBA
IC5	BA6212	IC	ROHM
IC6	BA6212	IC	ROHM
IC7	TC74HC42P	IC	TOSHIBA
IC8	BA6212	IC	ROHM
IC9	BA6212	IC	ROHM
Q1	2SA684(R)	Transistor	MATSUSHITA
Q2	2SC1570NP(F)	Transistor	SANYO
Q3	2SA684(R)	Transistor	MATSUSHITA
Q4	2SC1570NP(F)	Transistor	SANYO
Q5	2SA684(R)	Transistor	MATSUSHITA
Q6	2SC1570NP(F)	Transistor	SANYO
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D30	MA165	Diode	MATSUSHITA
R1	QRD161J-680	CR	68 1/6 W
R2	QRD161J-470	CR	47 1/6 W
R3	QRD161J-103	CR	10 K 1/6 W
R4	QRD161J-102	CR	1 K 1/6 W
R5	QRD161J-103	CR	10 K 1/6 W
R6	QRD161J-472	CR	4.7 K 1/6 W
R7	QRD161J-680	CR	68 1/6 W
R8	QRD161J-470	CR	47 1/6 W
R9	QRD161J-103	CR	10 K 1/6 W
R10	QRD161J-102	CR	1 K 1/6 W
R11	QRD161J-103	CR	10 K 1/6 W
R12	QRD161J-472	CR	4.7 K 1/6 W
R13	QRD161J-680	CR	68 1/6 W
R14	QRD161J-470	CR	47 1/6 W
R15	QRD161J-103	CR	10 K 1/6 W
R16	QRD161J-102	CR	1 K 1/6 W
R17	QRD161J-103	CR	10 K 1/6 W
R18	QRD161J-472	CR	4.7 K 1/6 W
C1	QETC1EM-106	E Cap	10 25 V
C2	QETC1EM-106	E Cap	10 25 V
C3	QCZ0206-104	E Cap	0.1
C4	QCZ0206-104	E Cap	0.1
C5	QCZ0206-104	E Cap	0.1
C6	QCZ0206-104	E Cap	0.1
C7	QCZ0206-104	E Cap	0.1
C8	QCZ0206-104	E Cap	0.1
C9	QCZ0206-104	E Cap	0.1
C10	QCZ0206-104	E Cap	0.1
C11	QCZ0206-104	E Cap	0.1
S1~S30	Refer to the section 5.1.		Ⓐ
CN1	SC42463-034	Connector	34 Pin

7.2 WI board assembly 0 2

0 2 □ □ □ □ □ □

Symbol No.	Part No.	Part Name	Description
IC1	LR74HC138	IC	SHARP
IC2	BA6212	IC	ROHM
Q1	2SC1570NP(F)	Transistor	SANYO
Q2	2SC1570NP(F)	Transistor	SANYO
Q3	2SC1570NP(F)	Transistor	SANYO
D1~D24	LT-9120H	LED	WIPE PATTERN
R1	QRD161J-103	CR	10 K 1/6 W
R2	QRD161J-682	CR	6.8 K 1/6 W
R3	QRD161J-221	CR	220 1/6 W
R4	QRD161J-221	CR	220 1/6 W
R5	QRD161J-221	CR	220 1/6 W
R6	QRD161J-221	CR	220 1/6 W
R7	QRD161J-103	CR	10 K 1/6 W
R8	QRD161J-682	CR	6.8 K 1/6 W
R9	QRD161J-221	CR	220 1/6 W
R10	QRD161J-221	CR	220 1/6 W
R11	QRD161J-221	CR	220 1/6 W
R12	QRD161J-221	CR	220 1/6 W
R13	QRD161J-103	CR	10 K 1/6 W
R14	QRD161J-682	CR	6.8 K 1/6 W
R15	QRD161J-221	CR	220 1/6 W
R16	QRD161J-221	CR	220 1/6 W
R17	QRD161J-221	CR	220 1/6 W
R18	QRD161J-221	CR	220 1/6 W
C1	QCZ0206-104	E Cap	0.1
C2	QCZ0206-104	E Cap	0.1
CN20	SS31053-010	Cardfitsocket	10 Pin

7.3 FC board assembly 0 3

0 3 □ □ □ □ □ □

Symbol No.	Part No.	Part Name	Description
IC1	BA6212	IC	ROHM
IC2	LR74HC138	IC	SHARP
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	LT-9120N	LED	KEY ON
D28	LT-9120N	LED	DSK ON
R1	QRD161J-682	CR	6.8 K 1/6 W
R2	QRD161J-682	CR	6.8 K 1/6 W
R3	QRD161J-103	CR	10 K 1/6 W
R4	QRD161J-103	CR	10 K 1/6 W
R5	QRV141F-56R0AY	MFR	56 1/4 W
R6	QRV141F-56R0AY	MFR	56 1/4 W
R7	QRD161J-221	CR	220 1/6 W
R8	QRD161J-221	CR	220 1/6 W
VR1	SCV1527-103	VR	10 K MASK/PST
VR2	SCV1527-103	VR	10 K SOFT
VR3	SCV1527-103	VR	10 K BORDER
VR4	SCV1527-103	VR	10 K ASPECT
VR5	SCV1527-103	VR	10 K SLICE
VR6	SCV1527-103	VR	10 K GAIN
C1	QETC1EM-106	E Cap	10 25 V
C2	QCZ0206-104	E Cap	0.1
C3	QCZ0206-104	E Cap	0.1

Symbol No.	Part No.	Part Name	Description
S1~S8	Refer to the section 5.1.		Ⓒ
S9~S27	Refer to the section 5.1.		Ⓑ
S28	Refer to the section 5.1.		Ⓒ
CN3	SC42462-026	Connector	
CN4	SC42462-050	Connector	
CN20	SS31053-010	Cardfit	
CN50	SS30644-004	Connector	4 Pin
CN51	SS30644-004	Connector	4 Pin
CN52	SS30644-003	Connector	3 Pin

7.4 TK board assembly 04

04□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	BA6212	IC	ROHM
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
R1	QRD161J-470	CR	47 1/6 W
R2	QRD161J-470	CR	47 1/6 W
R3	QRD161J-470	CR	47 1/6 W
C1	QETC1EM-106	E Cap	10 25 V
C2	QETC1EM-106	E Cap	10 25 V
C3	QCZ0206-104	C Cap	0.1
S1~S5	Refer to the section 5.1.		Ⓐ
CN5	SC42462-020	Connector	

7.5 CM board assembly 05

05☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC1	BA6212	IC	ROHM
IC2	BA6212	IC	ROHM
IC3	TC74HC4515P	IC	TOSHIBA
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D30	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
D32	MA165	Diode	MATSUSHITA
D33	MA165	Diode	MATSUSHITA
D34	MA165	Diode	MATSUSHITA
D35	MA165	Diode	MATSUSHITA
D36	MA165	Diode	MATSUSHITA
D37	MA165	Diode	MATSUSHITA
D38	MA165	Diode	MATSUSHITA
LD1	LT-9210N	LED	ROHM EDITOR ENABLE
R1	QRV141F-56R0AY	MFR	56 1/4 W
R2	QRD161J-472	CR	4.7 K 1/6 W
VR1	SCV1527-103	VR	10 K HUE
VR2	SCV1527-103	VR	10 K SLICE
VR3	SCV1527-103	VR	10 K GAIN

Symbol No.	Part No.	Part Name	Description
C1	QCZ0206-104	C Cap	0.1
C2	QCZ0206-104	C Cap	0.1
C3	QCZ0206-104	C Cap	0.1
S1~S3	Refer to the section 5.1.		Ⓑ
S4~S17	Refer to the section 5.1.		Ⓒ
S18~S28	Refer to the section 5.1.		Ⓑ
CN2	SC42462-060	Connector	60 Pin
CN8	SC30644-008	Connector	8 Pin
CN9	SC30644-003	Connector	3 Pin
CN10	SC30644-003	Connector	3 Pin
CN11	SC30644-003	Connector	3 Pin
CN12	SC30644-003	Connector	3 Pin
CN50	SC30644-004	Connector	4 Pin
CN51	SC30644-004	Connector	4 Pin

7.6 DI board assembly 06

06□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	TC40H004P	IC	TOSHIBA
IC2	UPD74HC393C	IC	NEC
⚠ IC3	HD26LS31P	IC	HITACHI
IC4	SN75188N	IC	TEXAS
⚠ IC5	HD26LS32P	IC	HITACHI
IC6	SN75189AN	IC	TEXAS
IC7	TC40H004P	IC	TOSHIBA
IC8	LH0080A	IC	SHARP
IC9	LH0082A	IC	SHARP
IC10	BU18440B	IC	ROHM
IC11	TC74HCO8P	IC	TOSHIBA
IC12	LR74HC138	IC	SHARP
IC13	PLSC1007-V1-00	IC	Parts are supplied in packs of 3 (or 2 according to ROM version) units.
IC14	PLSC1007-V1-00	IC	
IC15	PLSC1007-V1-00	IC	
IC16	TC5564APL-15	IC	TOSHIBA
IC17	TC5564APL-15	IC	TOSHIBA
IC18	LR74HC245	IC	SHARP
IC19	LR74HC245	IC	SHARP
IC20	LR74HC32	IC	SHARP
IC21	LR74HC138	IC	SHARP
IC22	LR74HC245	IC	SHARP
IC23	UPD71055C	IC	NEC
IC24	UPD71055C	IC	NEC
IC25	UPD71055C	IC	NEC
IC26	UPD71055C	IC	NEC
IC27	UPD8279C-5	IC	NEC
IC28	UPD8279C-5	IC	NEC
IC29	LR74HC138	IC	SHARP
IC30	LR74HC138	IC	SHARP
IC31	LR74HC245	IC	SHARP
IC32	LR74HC245	IC	SHARP
IC33	TC4071BP	IC	TOSHIBA
IC34	TC4072BP	IC	TOSHIBA
IC35	TC4030BP	IC	TOSHIBA
IC36	TC4013BAP	IC	TOSHIBA
IC37	TC4013BAP	IC	TOSHIBA
IC38	TC4071BP	IC	TOSHIBA
IC39	TC4011BP	IC	TOSHIBA
IC40	TC40HOO4P	IC	TOSHIBA
IC41	TC4024BP	IC	TOSHIBA
IC42	TC4099BP	IC	TOSHIBA
IC43	TC4099BP	IC	TOSHIBA
IC44	HA17012PC	IC	HITACHI
IC45	TC4030BP	IC	TOSHIBA
IC46	TC4013BAP	IC	TOSHIBA
IC47	BA6212	IC	ROHM
IC48	BA6212	IC	ROHM
IC49	BA6212	IC	ROHM
IC50	BA6212	IC	ROHM
IC51	BA6212	IC	ROHM
IC52	AN6914	IC	MATSUSHITA
IC53	NJM4560DD	IC	JRC
IC54	NJM4558DD	IC	JRC
IC55	NJM4558DD	IC	JRC
IC56	AN6914	IC	MATSUSHITA
IC57	TC4051BP	IC	TOSHIBA
IC58	TC4051BP	IC	TOSHIBA
IC59	TC40HOO4P	IC	TOSHIBA
IC60	TA78005AP	IC	TOSHIBA

Symbol No.	Part No.	Part Name	Description
IC61	TA78005AP	IC	TOSHIBA
IC62	NJM79L09A	IC	JRC
Q1	2SC1570NP(F)	Transistor	SANYO
Q2	2SA929(F)	Transistor	SANYO
Q3	2SC1570NP(F)	Transistor	SANYO
Q4	2SC1570NP(F)	Transistor	SANYO
Q5	2SC1570NP(F)	Transistor	SANYO
Q6	2SC1570NP(F)	Transistor	SANYO
Q7	2SA684(R)	Transistor	
Q8	2SA684(R)	Transistor	
Q9	2SA684(R)	Transistor	
Q10	2SA684(R)	Transistor	
Q11	2SA684(R)	Transistor	
Q12	2SA684(R)	Transistor	
Q13	2SA684(R)	Transistor	
Q14	2SA684(R)	Transistor	
Q15	2SA684(R)	Transistor	
Q16	2SA684(R)	Transistor	
Q17	2SA684(R)	Transistor	
Q18	2SA684(R)	Transistor	
Q19	2SA684(R)	Transistor	
Q20	2SA684(R)	Transistor	
Q21	2SA684(R)	Transistor	
Q22	2SA684(R)	Transistor	
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D8	GZA3.3(Y)-BY	Diode	MATSUSHITA
R1	QRD161J-473	CR	47 K 1/6 W
R2	QRD161J-101	CR	100 1/6 W
R3	QRD161J-223	CR	22 K 1/6 W
R4	QRD161J-471	CR	470 1/6 W
R5	QRD161J-103	CR	10 K 1/6 W
R6	QRD161J-222	CR	2.2 K 1/6 W
R7	QRD161J-472	CR	4.7 K 1/6 W
R8	QRD161J-105	CR	1 M 1/6 W
R9	QRD161J-102	CR	1 K 1/6 W
R10	QRD161J-102	CR	1 K 1/6 W
R11	QRD161J-102	CR	1 K 1/6 W
R12	QRD161J-102	CR	1 K 1/6 W
R13	QRD161J-102	CR	1 K 1/6 W
R14	QRD161J-105	CR	1 M 1/6 W
R15	QRD161J-102	CR	1 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R16	QRD161J-102	CR	1 K 1/6 W
R17	QRD161J-102	CR	1 K 1/6 W
R18	QRD161J-103	CR	10 K 1/6 W
R19	QRD161J-472	CR	4.7 K 1/6 W
R21	QRD161J-103	CR	10 K 1/6 W
R22	QRD161J-103	CR	10 K 1/6 W
R23	QRD161J-103	CR	10 K 1/6 W
R24	QRD161J-332	CR	3.3 K 1/6 W
R25	QRD161J-332	CR	3.3 K 1/6 W
R26	QRD161J-101	CR	100
R27	QRD161J-103	CR	10 K 1/6 W
R28	QRD161J-103	CR	10 K 1/6 W
R29	QRD161J-103	CR	10 K 1/6 W
R30	QRD161J-682	CR	6.8 K 1/6 W
R31	QRD161J-682	CR	6.8 K 1/6 W
R32	QRD161J-103	CR	10 K 1/6 W
R33	QRD161J-103	CR	10 K 1/6 W
R34	QRD161J-680	CR	68 1/6 W
R35	QRD161J-680	CR	68 1/6 W
R36	QRD161J-103	CR	10 K 1/6 W
R37	QRD161J-103	CR	10 K 1/6 W
R38	QRD161J-682	CR	6.8 K 1/6 W
R39	QRD161J-682	CR	6.8 K 1/6 W
R40	QRD161J-680	CR	68 1/6 W
R41	QRD161J-680	CR	68 1/6 W
R42	QRD161J-103	CR	10 K 1/6 W
R43	QRD161J-103	CR	10 K 1/6 W
R44	QRD161J-682	CR	6.8 K 1/6 W
R45	QRD161J-682	CR	6.8 K 1/6 W
R46	QRD161J-680	CR	68 1/6 W
R47	QRD161J-680	CR	68 1/6 W
R48	QRD161J-103	CR	10 K 1/6 W
R49	QRD161J-103	CR	10 K 1/6 W
R50	QRD161J-682	CR	6.8 K 1/6 W
R51	QRD161J-682	CR	6.8 K 1/6 W
R52	QRD161J-680	CR	68 1/6 W
R53	QRD161J-680	CR	68 1/6 W
R54	QRD161J-103	CR	10 K 1/6 W
R55	QRD161J-103	CR	10 K
R56	QRD161J-682	CR	6.8 K 1/6 W
R57	QRD161J-682	CR	6.8 K 1/6 W
R58	QRD161J-680	CR	68 1/6 W
R59	QRD161J-680	CR	68 1/6 W
R60	QRD161J-103	CR	10 K 1/6 W
R61	QRD161J-103	CR	10 K 1/6 W
R62	QRD161J-682	CR	6.8 K 1/6 W
R63	QRD161J-682	CR	6.8 K 1/6 W
R64	QRD161J-680	CR	68 1/6 W
R65	QRD161J-680	CR	68 1/6 W
R66	QRD161J-103	CR	10 K 1/6 W
R67	QRD161J-103	CR	10 K 1/6 W
R68	QRD161J-682	CR	6.8 K 1/6 W
R69	QRD161J-682	CR	6.8 K 1/6 W
R70	QRD161J-680	CR	68 1/6 W
R71	QRD161J-680	CR	68 1/6 W
R72	QRD161J-103	CR	10 K 1/6 W
R73	QRD161J-103	CR	10 K 1/6 W
R74	QRD161J-682	CR	6.8 K 1/6 W
R75	QRD161J-682	CR	6.8 K 1/6 W
R76	QRD161J-680	CR	68 1/6 W
R77	QRD161J-680	CR	68 1/6 W
R78	QRD161J-473	CR	47 K 1/6 W
R79	QRD161J-222	CR	2.2 K 1/6 W
R80	QRD161J-472	CR	4.7 K 1/6 W
R81	QRD161J-822	CR	8.2 K 1/6 W
R82	QRV141F-6800AY	CR	68 1/4 W
R83	QRV141F-6800AY	CR	68 1/4 W
R84	QRD161J-104	CR	100 K 1/6 W
R85	QRD161J-104	CR	100 K 1/6 W
R86	QRD161J-223	CR	22 K 1/6 W
R87	QRD161J-682	CR	6.8 K 1/6 W
R88	QRD161J-223	CR	22 K 1/6 W
R89	QRD161J-223	CR	22 K 1/6 W
R90	QRD161J-223	CR	22 K 1/6 W
R91	QRD161J-682	CR	6.8 K 1/6 W
R100	–	–	
R101	–	–	
⚠ R102	QRZ0052-220	FR	22
R103	QRD161J-473	CR	47 K 1/6 W
R104	QRD161J-101	CR	100 1/6 W
R105	QRD161J-224	CR	220 K 1/6 W
R107	QRD161J-103	CR	10 K 1/6 W
R108	QRD161J-103	CR	10 K 1/6 W
R109	QRD161J-103	CR	10 K 1/6 W
R110	QRD161J-103	CR	10 K 1/6 W
R111	QRD161J-103	CR	10 K 1/6 W
R112	QRD161J-103	CR	10 K 1/6 W
R115	QRD161J-102	CR	1 K 1/6 W
R116	QRD161J-102	CR	1 K 1/6 W
R117	QRD161J-102	CR	1 K 1/6 W
R118	QRD161J-102	CR	1 K 1/6 W
R119	QRD161J-102	CR	1 K 1/6 W
R120	QRD161J-102	CR	1 K 1/6 W
R121	QRD161J-102	CR	1 K 1/6 W
R122	QRD161J-102	CR	1 K 1/6 W
R123	QRD161J-103	CR	10 K 1/6 W
R124	QRD161J-102	CR	1 K 1/6 W
R125	QRD161J-102	CR	1 K 1/6 W
R126	QRD161J-102	CR	1 K 1/6 W
R127	QRD161J-102	CR	1 K 1/6 W
R128	QRD161J-102	CR	1 K 1/6 W
R129	QRD161J-102	CR	1 K 1/6 W
R130	QRD161J-102	CR	1 K 1/6 W
R131	QRD161J-102	CR	1 K 1/6 W
R132	QRD161J-223	CR	22 K 1/6 W
R133	QRD161J-103	CR	10 K 1/6 W
R134	QRD161J-103	CR	10 K 1/6 W
R135	QRD161J-103	CR	10 K 1/6 W
R136	QRD161J-222	CR	2.2 K 1/6 W
R137	QRD161J-103	CR	10 K 1/6 W
R138	QRD161J-222	CR	2.2 K 1/6 W
R139	QRD161J-103	CR	10 K 1/6 W
⚠ R150	QRZ0052-220	FR	22
R151	QRD141J-470	CR	47 1/4 W
R153	QRD161J-563	CR	56 K 1/6 W
VR1–VR4	QVPB613-103	VR	10 K

Symbol No.	Part No.	Part Name	Description
C1	QETC1HM-105	E Cap	1 50 V
C2	QCZ0206-104	C Cap	0.1
C3	QCS11HJ-220	C Cap	22 P
C4	QCS11HJ-100	C Cap	10 P
C5	QCZ0206-104	C Cap	0.1
C6	QCS11HJ-100	C Cap	10 P
C7	QCS11HJ-220	C Cap	22 P
C8	QCZ0206-104	C Cap	0.1
C9	QCZ0206-104	C Cap	0.1
C10	QCZ0206-104	C Cap	0.1
C11	QCZ0206-104	C Cap	0.1
C12	QCZ0206-104	C Cap	0.1
C13	QCZ0206-104	C Cap	0.1
C14	QCZ0206-104	C Cap	0.1
C15	QCZ0206-104	C Cap	0.1
C16	QCZ0206-104	C Cap	0.1
C17	QCS11HJ-102	C Cap	1000 P
C18	SMV2209-104	E Cap	0.1 5.5 V
C19	QCZ0206-104	C Cap	0.1
C20	QCZ0206-104	C Cap	0.1
C22	QCZ0206-104	C Cap	0.1
C23	QCZ0206-104	C Cap	0.1
C24	QCZ0206-104	C Cap	0.1
C26	QCS11HJ-102	C Cap	1000 P
C27	QCS11HJ-102	C Cap	1000 P
C28	QCZ0206-104	C Cap	0.1
C30	QCZ0206-104	C Cap	0.1
C31	QCZ0206-104	C Cap	0.1
C32	QCZ0206-104	C Cap	0.1
C33	QETC1AM-107	E Cap	100 10 V
C34	QETC1AM-107	E Cap	100 10 V
C35	QFN41HJ-102	MY Cap	1000 P 50 V
C36	QCZ0206-104	C Cap	0.1
C37	QCZ0206-104	C Cap	0.1
C38	QCZ0206-104	C Cap	0.1
C39	QCZ0206-104	C Cap	0.1
C40	QCZ0206-104	C Cap	0.1
C41	QCZ0206-104	C Cap	0.1
C42	QCS11HJ-220	C Cap	22 P
C43	QETC1EM-226	E Cap	22 25 V
C44	QCZ0206-104	C Cap	0.1
C45	QFN41HJ-102	MY Cap	1000 P 50 V
C46	QFN41HJ-102	MY Cap	1000 P 50 V
C47	QFN41HJ-102	MY Cap	1000 P 50 V
C48	QCZ0206-104	C Cap	0.1
C49	QCZ0206-104	C Cap	0.1
C50	QCZ0206-104	C Cap	0.1
C51	QCZ0206-104	C Cap	0.1
C52	QCZ0206-104	C Cap	0.1
C54	QCZ0206-104	C Cap	0.1
C55	QCZ0206-104	C Cap	0.1
C56	QCS11HJ-101	C Cap	100 P
C57	QCZ0206-104	C Cap	0.1
C58	QETC1HM-105	E Cap	1 50 V
C59	QFN41HJ-103	MY Cap	0.01 50 V
C60	QFN41HJ-104	MY Cap	0.1 50 V

Symbol No.	Part No.	Part Name	Description
C61	QFN41HJ-153	MY Cap	0.015 50 V
C62	QFN41HJ-104	MY Cap	0.1 50 V
C63	QCS11HJ-101	C Cap	100 P
C64	QCZ0206-104	C Cap	0.1
C66	QETB1AM-108	E Cap	1000 10 V
C67	QCZ0206-104	C Cap	0.1
C68	QCZ0206-104	C Cap	0.1
C69	QETB1CM-107	E Cap	100 16 V
C70	QCZ0206-104	C Cap	0.1
C71	QETB1CM-107	E Cap	100 16 V
C72	QETC1AM-107	E Cap	100 16 V
C73	QETC1AM-107	E Cap	100 16 V
C76	QETB1CM-107	E Cap	100 16 V
C77	QETB1AM-108	E Cap	1000 10 V
C78	QETB1CM-107	E Cap	100 16 V
C79	QCZ0206-104	C Cap	0.1
C80	QCZ0206-104	C Cap	0.1
C81	QCZ0206-104	C Cap	0.1
C82	QCZ0206-104	C Cap	0.1
C83	QCZ0206-104	C Cap	0.1
C84	QCZ0206-104	C Cap	0.1
C85	QCZ0206-104	C Cap	0.1
C86	QCZ0206-104	C Cap	0.1
C87	QCZ0206-104	C Cap	0.1
C88	QCZ0206-104	C Cap	0.1
C89	QCZ0206-104	C Cap	0.1
C90	QCZ0206-104	C Cap	0.1
C91	QCZ0206-104	C Cap	0.1
C92	QCZ0206-104	C Cap	0.1
C93	QCZ0206-104	C Cap	0.1
C94	QCZ0206-104	C Cap	0.1
C95	QCZ0206-104	C Cap	0.1
C96	QCZ0206-104	C Cap	0.1
C97	QCZ0206-104	C Cap	0.1
C98	QCZ0206-104	C Cap	0.1
C99	QCZ0206-104	C Cap	0.1
C100	QCZ0206-104	C Cap	0.1
C101	QCZ0206-104	C Cap	0.1
C150	QFN41HJ-154	MY Cap	0.15 50 V
⚠ LC1~157	EXC-EMT271BT	EMI Filter	
RA1	QRB081J-103	Resister Alay	10 K ×8
RA2	QRB081J-103	Resister Alay	10 K ×8
RA3	QRB041J-103	Resister Alay	10 K ×4
RA4	QRB081J-103	Resister Alay	10 K ×8
RA5	QRB041J-103	Resister Alay	10 K ×4
RA6	QRB081J-103	Resister Alay	10 K ×8
X1	SSV0387	CRYSTAL	4.9 MHz
X2	SCV1398	CRYSTAL	8 MHz
S1	SCV0516-A18JB2	Switch	Hard Reset

Symbol No.	Part No.	Part Name	Description
BZ1	SSV0275	Buzzer	
CN1	SC42462-034	Connector	
CN2	SC42462-060	Connector	
CN3	SC42462-026	Connector	
CN4	SC42462-050	Connector	
CN5	SC42462-020	Connector	
CN24	SCV1469-S09	Connector	TO EDITOR
CN25	SCV1469-S09	Connector	TO MAIN UNIT

7.7 PS unit board assembly 07

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Symbol No.	Part No.	Part Name	Description
⚠ HIC11	SCV1576-HIC11	Function Module	
IC51	NJM78M12A	IC	JRC
Q11	2SC2792	Transistor	
D11	RGP-10M	Diode	General Electric
⚠ DB1	ERC26-06	Diode Bridge	
⚠ D51	10DF6	Diode	
⚠ D52	10D-2	Diode	
LD51	GL-3PR7	LED	SHARP
DT51	C10P039	Diode	
DT52	ESAC25-02C	Diode	FUJI ELECTRIC
ZD51	HZ6A1L	Zener Diode	HITACHI
PC11	SFH601G-3	Photo Coupler	
THY51	CR6AM2	Thyrister	MITSUBISHI
SHR51	TL431C-LPB	IC	TEXAS
R1	QRF051K-2R7	UFR	2.7 5 W
R2	QRF051K-100	UFR	10 5 W
R11	QRD121J-224	CR	220 K 1/2 W
R12	QRD121J-224	CR	220 K 1/2 W
R13	QRD121J-564	CR	560 K 1/2 W
R14	QRF056J-102	UFR	1 K 5 W
R15	QRG026J-270	OMR	27 2 W
R16	QRG026J-2R7	OMR	2.7 2 W
R51	QRG026J-470	OMR	47 2 W
R52	QRG026J-271	OMR	270 2 W
R53	QRD141J-222	CR	2.2 K 1/4 W
R54	QRD141J-133	CR	13 K 1/4 W
R56	QRD141J-561	CR	560 1/4 W
R57	QRD141J-5R1	CR	5 1/4 W
R58	QRD141J-152	CR	1.5 K 1/4 W
R59	QRD141J-331	CR	330 1/4 W
R60	QRD141J-121	CR	120 1/4 W
R61	QRD141J-561	CR	560 1/4 W
R62	QRD141J-561	CR	560 1/4 W
R70	QRD141J-330	CR	33 1/4 W

Symbol No.	Part No.	Part Name	Description
VR51	SCV1576-VR1	VR	1 K
C2	QFZ9017-224	MY Cap	0.22 AC 250 V
C3	QFN42EK-472	MY Cap	4700 P 250 V
C4	QFN42EK-472	MY Cap	4700 P 250 V
C5	SCV1576-C5	MY Cap	470 P AC 400 V
C6	SCV1576-C5	MY Cap	470 P AC 400 V
C13	SCV1576-C13	E Cap	82 250 V
C14	SCV1576-C13	E Cap	82 250 V
C15	SCV1576-C15	MY Cap	0.022 1 kV
C16	SCV1576-C16	MY Cap	220 P 2 kV
C17	QETB1EM-107	E Cap	100 25 V
C18	QETB1EM-106	E Cap	10 25 V
C19	QFN41HJ-224	MY Cap	0.22 50 V
C51	SCV1576-C51	E Cap	6800 10 V
C52	SCV1576-C52	E Cap	1500 10 V
C53	QETB1CM-228	E Cap	2200 16 V
C54	QETB1CM-228	E Cap	2200 16 V
C55	SCV1576-C55	E Cap	270 25 V
C56	QETB1CM-477	E Cap	470 16 V
C58	QFN41HJ-103	MY Cap	0.01 50 V
C60	QFN41HJ-104	MY Cap	0.1 50 V
C61	SCV1576-C61	MY Cap	100 P 100 V
C71	QFN41HJ-104	MY Cap	0.1 50 V
C101	QFN42EK-472	MY Cap	4700 P 250 V
C102	QFN42EK-472	MY Cap	4700 P 250 V
⚠ LF1	SCV1576-LF1	Line Filter	
⚠ L11	SCV1576-K49	Choke Coil	
⚠ L12	SCV1576-K49	Choke Coil	
⚠ L51	SCV1576-K29	Choke Coil	
⚠ L52	SCV1576-K29	Choke Coil	
⚠ T11	SCV1576-T11	Drive Trans	

7.8 CP board assembly [0][8]

[0][8]☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC2	TC4051BP	IC	TOSHIBA
IC3	TC4051BP	IC	TOSHIBA
IC4	TC4051BP	IC	TOSHIBA
IC5	TC4051BP	IC	TOSHIBA
IC6	TC4051BP	IC	TOSHIBA
IC7	TC4051BP	IC	TOSHIBA
IC8	TC4051BP	IC	TOSHIBA
IC9	TC4051BP	IC	TOSHIBA
IC10	TC4051BP	IC	TOSHIBA
IC11	TC4051BP	IC	TOSHIBA
IC12	TC4051BP	IC	TOSHIBA
IC13	TC4051BP	IC	TOSHIBA
IC14	TC4051BP	IC	TOSHIBA
IC15	TC4051BP	IC	TOSHIBA
IC16	TC4051BP	IC	TOSHIBA
IC17	TC4051BP	IC	TOSHIBA
IC18	TC4051BP	IC	TOSHIBA
IC19	TC4051BP	IC	TOSHIBA
IC20	TC50H000P	IC	TOSHIBA
IC21	TC50H000P	IC	TOSHIBA
IC22	TC4053BP	IC	TOSHIBA
IC23	TC4053BP	IC	TOSHIBA
IC27	TA78L005AP	IC	TOSHIBA
IC28	SCV0270-001	Function Module	JVC
IC29	SCV0270-001	Function Module	JVC
IC30	SCV0270-001	Function Module	JVC
Q13	2SC1685(R.S)	Transistor	MATSUSHITA
Q14	2SC1685(R.S)	Transistor	MATSUSHITA
Q18	2SC1685(R.S)	Transistor	MATSUSHITA
Q19	2SC1685(R.S)	Transistor	MATSUSHITA
Q20	2SC1685(R.S)	Transistor	MATSUSHITA
Q601	2SC1685(R.S)	Transistor	MATSUSHITA
Q602	2SC1685(R.S)	Transistor	MATSUSHITA
Q603	2SC1685(R.S)	Transistor	MATSUSHITA
Q604	2SC1685(R.S)	Transistor	MATSUSHITA
Q605	2SC1685(R.S)	Transistor	MATSUSHITA
Q607	2SA564(R)	Transistor	MATSUSHITA
Q608	2SC1685(R.S)	Transistor	MATSUSHITA
Q610	2SA564(R)	Transistor	MATSUSHITA
Q611	2SC1685(R.S)	Transistor	MATSUSHITA
Q612	2SC1685(R.S)	Transistor	MATSUSHITA
Q701	2SC1685(R.S)	Transistor	MATSUSHITA
Q702	2SC1685(R.S)	Transistor	MATSUSHITA
Q703	2SC1685(R.S)	Transistor	MATSUSHITA
Q704	2SC1685(R.S)	Transistor	MATSUSHITA
Q705	2SC1685(R.S)	Transistor	MATSUSHITA
Q707	2SA564(R)	Transistor	MATSUSHITA
Q708	2SC1685(R.S)	Transistor	MATSUSHITA
Q710	2SA564(R)	Transistor	MATSUSHITA
Q711	2SC1685(R.S)	Transistor	MATSUSHITA
Q712	2SC1685(R.S)	Transistor	MATSUSHITA
Q801	2SC1685(R.S)	Transistor	MATSUSHITA
Q802	2SC1685(R.S)	Transistor	MATSUSHITA
Q803	2SC1685(R.S)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
Q804	2SC1685(R.S)	Transistor	MATSUSHITA
Q805	2SC1685(R.S)	Transistor	MATSUSHITA
Q807	2SA564(R)	Transistor	MATSUSHITA
Q808	2SC1685(R.S)	Transistor	MATSUSHITA
Q810	2SA564(R)	Transistor	MATSUSHITA
Q811	2SC1685(R.S)	Transistor	MATSUSHITA
Q812	2SC1685(R.S)	Transistor	MATSUSHITA
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
R1	QVPB613-501	VR	500 BC Y GAIN
R2	QVPB613-501	VR	500 BC R-Y GAIN
R3	QVPB613-501	VR	500 BC B-Y GAIN
R4	QVPB613-102	VR	1 K BC BL
R5	QVPB613-102	VR	1 K Y6 IN GAIN
R6	QVPB613-102	VR	1 K R-Y6 IN GAIN
R7	QVPB613-102	VR	1 K B-Y6 IN GAIN
R8	QVPB613-102	VR	1 K Y7 IN GAIN
R9	QVPB613-102	VR	1 K R-Y7 IN GAIN
R10	QVPB613-102	VR	1 K B-Y7 IN GAIN
R11	QVPB613-102	VR	1 K Y8 IN GAIN
R12	QVPB613-102	VR	1 K R-Y8 IN GAIN
R13	QVPB613-102	VR	1 K B-Y8 IN GAIN
R50	QRD161J-103	CR	10 K 1/6 W
R51	QRD161J-103	CR	10 K 1/6 W
R52	QRD161J-103	CR	10 K 1/6 W
R53	QRD161J-103	CR	10 K 1/6 W
R54	QRD161J-103	CR	10 K 1/6 W
R55	QRD161J-103	CR	10 K 1/6 W
R56	QRD161J-103	CR	10 K 1/6 W
R57	QRD161J-103	CR	10 K 1/6 W
R58	QRD161J-103	CR	10 K 1/6 W
R59	QRD161J-103	CR	10 K 1/6 W
R60	QRD161J-103	CR	10 K 1/6 W
R61	QRD161J-103	CR	10 K 1/6 W
R65	QRD161J-822	CR	8.2 K 1/6 W
R66	QRD161J-123	CR	12 K 1/6 W
R67	QRD161J-182	CR	1.8 K 1/6 W
R68	QRD161J-822	CR	8.2 K 1/6 W
R69	QRD161J-123	CR	12 K 1/6 W
R70	QRD161J-182	CR	1.8 K 1/6 W
R71	QRD161J-332	CR	3.3 K 1/6 W
R72	QRD161J-471	CR	470 1/6 W
R73	QRD161J-821	CR	820 1/6 W
R74	QRD161J-332	CR	3.3 K 1/6 W
R75	QRD161J-471	CR	470 1/6 W
R76	QRD161J-103	CR	10 K 1/6 W
R77	QRD161J-332	CR	3.3 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R78	QRD161J-471	CR	470 1/6 W
R79	QRD161J-103	CR	10 K 1/6 W
R80	QRD161J-273	CR	
R81	QRD161J-103	CR	10 K 1/6 W
R82	QRD161J-103	CR	10 K 1/6 W
R83	QRD161J-564	CR	560 K 1/6 W
R84	QRD161J-123	CR	12 K 1/6 W
R86	—	—	
R88	QRD161J-103	CR	10 K 1/6 W
R89	QRD161J-564	CR	560 K 1/6 W
R90	QRD161J-681	CR	680 1/6 W
R91	QRD161J-561	CR	560 1/6 W
R92	QRD161J-561	CR	560 1/6 W
R93	QRD161J-561	CR	560 1/6 W
R97	QRD161J-473	CR	47 K 1/6 W
R98	QRD161J-473	CR	47 K 1/6 W
R99	QRD161J-122	CR	1.2 K 1/6 W
R100	QRD161J-471	CR	470 1/6 W
R101	QRD161J-201	VR	200 Y6 OUT GAIN
R102	QRD161J-473	CR	47 K 1/6 W
R103	QRD161J-473	CR	47 K 1/6 W
R104	QRD161J-122	CR	1.2 K 1/6 W
R105	QRD161J-471	CR	470 1/6 W
R106	QRD161J-201	VR	200 R-Y6 OUT GAIN
R107	QRD161J-473	CR	47 K 1/6 W
R108	QRD161J-473	CR	47 K 1/6 W
R109	QRD161J-122	CR	1.2 K 1/6 W
R110	QRD161J-471	CR	470 1/6 W
R111	QVPB613-201	VR	200 B-Y6 OUT GAIN
R601	QRD161J-103	CR	10 K 1/6 W
R602	QRD161J-103	CR	10 K 1/6 W
R603	QRD161J-103	CR	10 K 1/6 W
R604	QRD161J-103	CR	10 K 1/6 W
R605	QRD161J-103	CR	10 K 1/6 W
R606	QRD161J-103	CR	10 K 1/6 W
R607	QRD161J-221	CR	220 1/6 W
R608	QRD161J-221	CR	220 1/6 W
R609	QRD161J-221	CR	220 1/6 W
R610	QRD161J-182	CR	1.8 K 1/6 W
R611	QRD161J-182	CR	1.8 K 1/6 W
R612	QRD161J-182	CR	1.8 K 1/6 W
R613	QRD161J-823	CR	82 K (NTSC only)
R614	QRD161J-155	CR	1.5 M (NTSC only)
R615	QRD161J-681	CR	680 1/6 W
R616	QRD161J-822	CR	8.2 K 1/6 W
R617	QRD161J-473	CR	47 K 1/6 W
R618	QRD161J-103	CR	10 K 1/6 W
R619	QRD161J-822	CR	8.2 K 1/6 W
R620	QRD161J-122	CR	1.2 K 1/6 W
R621	QRD161J-471	CR	470 1/6 W
R622	QRD161J-222	CR	2.2 K 1/6 W
R624	QRD161J-182	CR	1.8 K 1/6 W
R625	QRD161J-102	CR	1 K 1/6 W
R626	QRD161J-122	CR	1.2 K 1/6 W
R627	QRD161J-222	CR	2.2 K 1/6 W
R629	QRD161J-272	CR	2.7 K 1/6 W
R630	QRD161J-102	CR	1 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R631	QRD161J-183	CR	18 K 1/6 W
R632	QRD161J-223	CR	22 K 1/6 W
R633	QRD161J-222	CR	2.2 K 1/6 W
R634	QRD161J-222	CR	2.2 K 1/6 W
R635	QRD161J-222	CR	2.2 K 1/6 W
R701	QRD161J-103	CR	10 K 1/6 W
R702	QRD161J-103	CR	10 K 1/6 W
R703	QRD161J-103	CR	10 K 1/6 W
R704	QRD161J-103	CR	10 K 1/6 W
R705	QRD161J-103	CR	10 K 1/6 W
R706	QRD161J-103	CR	10 K 1/6 W
R707	QRD161J-221	CR	220 1/6 W
R708	QRD161J-221	CR	220 1/6 W
R709	QRD161J-221	CR	220 1/6 W
R710	QRD161J-182	CR	1.8 K 1/6 W
R711	QRD161J-182	CR	1.8 K 1/6 W
R712	QRD161J-182	CR	1.8 K 1/6 W
R713	QRD161J-823	CR	82 K (NTSC only)
R714	QRD161J-155	CR	1.5 M (NTSC only)
R715	QRD161J-681	CR	680 1/6 W
R716	QRD161J-822	CR	8.2 K 1/6 W
R717	QRD161J-473	CR	47 K 1/6 W
R718	QRD161J-103	CR	10 K 1/6 W
R719	QRD161J-822	CR	8.2 K 1/6 W
R720	QRD161J-122	CR	1.2 K 1/6 W
R721	QRD161J-471	CR	470 1/6 W
R722	QRD161J-222	CR	2.2 K 1/6 W
R724	QRD161J-182	CR	1.8 K 1/6 W
R725	QRD161J-102	CR	1 K 1/6 W
R726	QRD161J-122	CR	1.2 K 1/6 W
R727	QRD161J-222	CR	2.2 K 1/6 W
R729	QRD161J-272	CR	2.7 K 1/6 W
R730	QRD161J-102	CR	1 K 1/6 W
R731	QRD161J-183	CR	18 K 1/6 W
R732	QRD161J-223	CR	22 K 1/6 W
R733—735	QRD161J-222	CR	2.2 K 1/6 W
R801	QRD161J-103	CR	10 K 1/6 W
R802	QRD161J-103	CR	10 K 1/6 W
R803	QRD161J-103	CR	10 K 1/6 W
R804	QRD161J-103	CR	10 K 1/6 W
R805	QRD161J-103	CR	10 K 1/6 W
R806	QRD161J-103	CR	10 K 1/6 W
R807—809	QRD161J-221	CR	220 1/6 W
R810	QRD161J-182	CR	1.8 K 1/6 W
R811	QRD161J-182	CR	1.8 K 1/6 W
R812	QRD161J-182	CR	1.8 K 1/6 W
R813	QRD161J-823	CR	82 K (NTSC only)
R814	QRD161J-155	CR	1.5 M (NTSC only)
R815	QRD161J-681	CR	680 1/6 W
R816	QRD161J-822	CR	8.2 K 1/6 W
R817	QRD161J-473	CR	47 K 1/6 W
R818	QRD161J-103	CR	10 K 1/6 W
R819	QRD161J-822	CR	8.2 K 1/6 W
R820	QRD161J-122	CR	1.2 K 1/6 W
R821	QRD161J-471	CR	470 1/6 W
R822	QRD161J-222	CR	2.2 K 1/6 W
R824	QRD161J-182	CR	1.8 K 1/6 W
R825	QRD161J-102	CR	1 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R826	QRD161J-122	CR	1.2 K 1/6 W
R827	QRD161J-222	CR	2.2 K 1/6 W
R829	QRD161J-272	CR	2.7 K 1/6 W
R830	QRD161J-102	CR	1 K 1/6 W
R831	QRD161J-183	CR	18 K 1/6 W
R832	QRD161J-223	CR	22 K 1/6 W
R833	QRD161J-222	CR	2.2 K 1/6 W
R834	QRD161J-222	CR	2.2 K 1/6 W
R835	QRD161J-222	CR	2.2 K 1/6 W
C50	QER41CM-476	E Cap	47 16 V
C51	QER41CM-476	E Cap	47 16 V
C52	QER41CM-476	E Cap	47 16 V
C53	QER41CM-476	E Cap	47 16 V
C54	QER41CM-476	E Cap	47 16 V
C55	QER41CM-476	E Cap	47 16 V
C56	QEPCOJM-476	NP Cap	47 6.3 V
C57	QEPCOJM-476	NP Cap	47 6.3 V
C58	QEPCOJM-476	NP Cap	47 6.3 V
C59	QER41CM-476	E Cap	47 16 V
C60	QEPC1HM-105	NP Cap	1 50 V
C61	QEPC1HM-105	NP Cap	1 50 V
C62	QEPC1HM-105	NP Cap	1 50 V
C63	QEPC1HM-105	NP Cap	1 50 V
C64	QEPC1HM-105	NP Cap	1 50 V
C65	QEPC1HM-105	NP Cap	1 50 V
C66	QEPC1HM-105	NP Cap	1 50 V
C67	QEPC1HM-105	NP Cap	1 50 V
C68	QEPC1HM-105	NP Cap	1 50 V
C69	QEPC1HM-105	NP Cap	1 50 V
C70	QER41CM-476	E Cap	47 16 V
C71	QER41CM-476	E Cap	47 16 V
C72	QER41CM-476	E Cap	47 16 V
C73	QER41CM-476	E Cap	47 16 V
C74	QER41CM-476	E Cap	47 16 V
C75	QER41CM-476	E Cap	47 16 V
C76	QEPCOJM-476	NP Cap	47 6.3 V
C77	QEPCOJM-476	NP Cap	47 6.3 V
C78	QEPCOJM-476	NP Cap	47 6.3 V
C79	QER41CM-476	E Cap	47 16 V
C80	QEPC1HM-105	NP Cap	1 50 V
C81	QEPC1HM-105	NP Cap	1 50 V
C82	QEPC1HM-105	NP Cap	1 50 V
C83	QEPC1HM-105	NP Cap	1 50 V
C84	QEPC1HM-105	NP Cap	1 50 V
C85	QEPC1HM-105	NP Cap	1 50 V
C86	QEPC1HM-105	NP Cap	1 50 V
C87	QEPC1HM-105	NP Cap	1 50 V
C88	QEPC1HM-105	NP Cap	1 50 V
C89	QEPC1HM-105	NP Cap	1 50 V
C90	QER41CM-476	E Cap	47 16 V
C91	QER41CM-476	E Cap	47 16 V
C92	QER41CM-476	E Cap	47 16 V
C93	QER41CM-476	E Cap	47 16 V
C94	QER41CM-476	E Cap	47 16 V
C95	QER41CM-476	E Cap	47 16 V

Symbol No.	Part No.	Part Name	Description
C96	QEPC0JM-476	NP Cap	47 6.3 V
C97	QEPC0JM-476	NP Cap	47 6.3 V
C98	QEPC0JM-476	NP Cap	47 6.3 V
C99	QEPC0JM-476	NP Cap	47 6.3 V
C99	QER41CM-476	E Cap	47 16 V
C100	QEPC1HM-105	NP Cap	1 50 V
C101	QEPC1HM-105	NP Cap	1 50 V
C102	QEPC1HM-105	NP Cap	1 50 V
C103	QEPC1HM-105	NP Cap	1 50 V
C104	QEPC1HM-105	NP Cap	1 50 V
C105	QEPC1HM-105	NP Cap	1 50 V
C106	QEPC1HM-105	NP Cap	1 50 V
C107	QEPC1HM-105	NP Cap	1 50 V
C108	QEPC1HM-105	NP Cap	1 50 V
C109	QEPC1HM-105	NP Cap	1 50 V
C110	QER41EM-106	E Cap	10 25 V
C111	QER41EM-106	E Cap	10 25 V
C112	QER41CM-476	E Cap	47 16 V
C113	QER41CM-476	E Cap	47 16 V
C114	QER41CM-476	E Cap	47 16 V
C115	QER41CM-476	E Cap	47 16 V
C116	QER41CM-476	E Cap	47 16 V
C117	QER41CM-476	E Cap	47 16 V
C118	QER41CM-476	E Cap	47 16 V
C119	QCZ0206-104	C Cap	0.1
C120	QCZ0206-104	C Cap	0.1
C121	QER41CM-476	E Cap	47 16 V
C122	QER41CM-476	E Cap	47 16 V
C123	QER41CM-476	E Cap	47 16 V
C124	QER41CM-476	E Cap	47 16 V
C125	QER41CM-476	E Cap	47 16 V
C126	–	–	
C127	QER41CM-476	E Cap	47 16 V
C128	QER41CM-476	E Cap	47 16 V
C129	–	–	
C130	QER41CM-476	E Cap	47 16 V
C131	QER41CM-476	E Cap	47 16 V
C132	QER41CM-476	E Cap	47 16 V
C133	QER41CM-476	E Cap	47 16 V
C134	QER41CM-476	E Cap	47 16 V
C135	QER41CM-476	E Cap	47 16 V
C136	QER41CM-476	E Cap	47 16 V
C137	QEPC0JM-476	NP Cap	47 6.3 V
C138	QEPC0JM-476	NP Cap	47 6.3 V
C139	QEPC0JM-476	NP Cap	47 6.3 V
C140	QER41CM-476	E Cap	47 16 V
C141	QER41CM-476	E Cap	47 16 V
C142	QER41CM-476	E Cap	47 16 V
C143	QER41CM-476	E Cap	47 16 V
C144	QER41CM-476	E Cap	47 16 V
C145	QER41CM-476	E Cap	47 16 V
C146	QER41CM-476	E Cap	47 16 V
C147	QER41CM-476	E Cap	47 16 V
C148	QER41CM-476	E Cap	47 16 V
C149	QER41CM-476	E Cap	47 16 V
C150	QER41CM-476	E Cap	47 16 V
C151	QER41CM-476	E Cap	47 16 V
C152	QER41CM-476	E Cap	47 16 V

Symbol No.	Part No.	Part Name	Description
C601	QEPC0JM-476	NP Cap	47 6.3 V
C602	QEPC0JM-476	NP Cap	47 6.3 V
C603	QEPC0JM-476	NP Cap	47 6.3 V
C604	QER41CM-476	E Cap	47 16 V
C605	QER41CM-476	E Cap	47 16 V
C606	QER41CM-476	E Cap	47 16 V
C701	QEPC0JM-476	NP Cap	47 6.3 V
C702	QEPC0JM-476	NP Cap	47 6.3 V
C703	QEPC0JM-476	NP Cap	47 6.3 V
C704	QER41CM-476	E Cap	47 16 V
C705	QER41CM-476	E Cap	47 16 V
C706	QER41CM-476	E Cap	47 16 V
C801	QEPC0JM-476	NP Cap	47 6.3 V
C802	QEPC0JM-476	NP Cap	47 6.3 V
C803	QEPC0JM-476	NP Cap	47 6.3 V
C804	QER41CM-476	E Cap	47 16 V
C805	QER41CM-476	E Cap	47 16 V
C806	QER41CM-476	E Cap	47 16 V
DL1	SCV0572-001	Delay Line	120 nsec
DL2	SCV0572-001	Delay Line	120 nsec
DL3	SCV0572-001	Delay Line	120 nsec
DL4	SCV0703-001	Delay Line	
DL5	SCV0703-001	Delay Line	
DL6	SCV0703-001	Delay Line	
J1	SCV1147-001	Connector	
J2	SCV1147-001	Connector	
J3	SCV1147-001	Connector	
J4	SCV1147-001	Connector	
J5	SCV1147-001	Connector	
J6	SCV1147-001	Connector	
J7	SCV1147-001	Connector	
J8	SCV1147-001	Connector	
J9	SCV1147-001	Connector	
CBM1–30	**CBMC4360-00B**	**CPIN CBM**	
Q1	SC2814(F4.5)	Transistor	SANYO
Q2	SK198(Q.R)	FET	MATSUSHITA
Q3	SA1256(E4.5)	Transistor	SANYO
Q4	SC2814(F4.5)	Transistor	SANYO
Q5	SC2814(F4.5)	Transistor	SANYO
Q6	SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
D3	MA152K	Diode	MATSUSHITA
D4	MA152K	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCTO3CH-220	C Cap	22 P 50 V
CBM31–33	**CBMC4359-00B**	**CPO 1 CBM**	
Q1	SC2814(F4.5)	Transistor	SANYO
Q2	SC2814(F4.5)	Transistor	SANYO
Q3	SC2814(F4.5)	Transistor	SANYO
Q4	SC2814(F4.5)	Transistor	SANYO
Q5	SC2814(F4.5)	Transistor	SANYO
Q6	SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V
CBM34–36	**CBMC4364-00B**	**CPO 2 CBM**	
Q1	SC2814(F4.5)	Transistor	SANYO
Q2	SC2814(F4.5)	Transistor	SANYO
Q3	SC2814(F4.5)	Transistor	SANYO
Q4	SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V
CBM37–39	**CBMC4365-00B**	**CPO 3 CBM**	
Q1	SC2814(F4.5)	Transistor	SANYO
Q2	SC2814(F4.5)	Transistor	SANYO
Q3	SC2814(F4.5)	Transistor	SANYO
Q4	SC2814(F4.5)	Transistor	SANYO
Q5	SC2814(F4.5)	Transistor	SANYO
Q6	SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V

7.9 KEY board assembly 09

09☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC1	NJM4560DD	IC	JRC
IC2	NJM1496D	IC	JRC
IC3	NJM4560DD	IC	JRC
IC4	NJM1496D	IC	JRC
IC5	NJM4560DD	IC	JRC
IC6	NJM4560DD	IC	JRC
IC7	NJM1496D	IC	JRC
IC8	NJM1496D	IC	JRC
IC10	NJM4560DD	IC	JRC
IC11	NJM1496D	IC	JRC
IC12	NJM4560DD	IC	JRC
IC13	NJM311D	IC	JRC
IC14	TC4053BP	IC	TOSHIBA
IC15	TC4053BP	IC	TOSHIBA
IC16	TC4053BP	IC	TOSHIBA
IC17	TC4053BP	IC	TOSHIBA
IC18	TC4053BP	IC	TOSHIBA
IC19	TC4053BP	IC	TOSHIBA
IC20	TC4053BP	IC	TOSHIBA
IC21	TC4052BP	IC	TOSHIBA
IC22	TC4052BP	IC	TOSHIBA
IC23	TC4053BP	IC	TOSHIBA
IC24	TC4053BP	IC	TOSHIBA
IC25	–	–	
IC26	–	–	
IC27	–	–	
IC28	–	–	
IC29	TC50H000P	IC	TOSHIBA
IC30	TC4053BP	IC	TOSHIBA
IC31	NJM4560DD	IC	JRC
IC32	TA78L005AP	IC	TOSHIBA
IC34	TC4052BP	IC	TOSHIBA
Q1	2SC1685(R.S)	Transistor	MATSUSHITA
Q2	2SC1685(R.S)	Transistor	MATSUSHITA
Q3	2SA564(R)	Transistor	MATSUSHITA
Q4	2SA564(R)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q6	2SA564(R)	Transistor	MATSUSHITA
Q7	2SA564(R)	Transistor	MATSUSHITA
Q8	2SA564(R)	Transistor	MATSUSHITA
Q9	2SC1685(R.S)	Transistor	MATSUSHITA
Q10	2SC1685(R.S)	Transistor	MATSUSHITA
Q11	2SA564(R)	Transistor	MATSUSHITA
Q12	2SA564(R)	Transistor	MATSUSHITA
Q13	2SC1685(R.S)	Transistor	MATSUSHITA
Q14	2SC1685(R.S)	Transistor	MATSUSHITA
Q15	2SC1685(R.S)	Transistor	MATSUSHITA
Q16	2SC1685(R.S)	Transistor	MATSUSHITA
Q17	2SA564(R)	Transistor	MATSUSHITA
Q18	2SA564(R)	Transistor	MATSUSHITA
Q19	2SC1685(R.S)	Transistor	MATSUSHITA
Q20	2SC1685(R.S)	Transistor	MATSUSHITA
Q21	2SC1685(R.S)	Transistor	MATSUSHITA
Q22	2SC1685(R.S)	Transistor	MATSUSHITA
Q23	2SC1685(R.S)	Transistor	MATSUSHITA
Q24	2SC1685(R.S)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
Q25	2SA564(R)	Transistor	MATSUSHITA
Q33	2SC1685(R.S)	Transistor	MATSUSHITA
Q34	2SC1685(R.S)	Transistor	MATSUSHITA
Q35	2SC1685(R.S)	Transistor	MATSUSHITA
Q37	2SC1685(R.S)	Transistor	MATSUSHITA
Q38	2SC1685(R.S)	Transistor	MATSUSHITA
Q39	2SC1685(R.S)	Transistor	MATSUSHITA
Q41	2SC1685(R.S)	Transistor	MATSUSHITA
Q42	2SC1685(R.S)	Transistor	MATSUSHITA
Q43	2SC1685(R.S)	Transistor	MATSUSHITA
Q45	2SC1685(R.S)	Transistor	MATSUSHITA
Q46	2SC1685(R.S)	Transistor	MATSUSHITA
Q47	2SC1685(R.S)	Transistor	MATSUSHITA
Q49	2SC1685(R.S)	Transistor	MATSUSHITA
Q50	2SA564(R)	Transistor	MATSUSHITA
Q51	2SC1685(R.S)	Transistor	MATSUSHITA
Q52	2SA564(R)	Transistor	MATSUSHITA
Q53	2SC1685(R.S)	Transistor	MATSUSHITA
Q54	2SA564(R)	Transistor	MATSUSHITA
Q55	2SC1685(R.S)	Transistor	MATSUSHITA
Q56	2SC1685(R.S)	Transistor	MATSUSHITA
Q57	2SA564(R)	Transistor	MATSUSHITA
Q58	2SC1685(R.S)	Transistor	MATSUSHITA
Q59	2SA564(R)	Transistor	MATSUSHITA
Q60	2SC1685(R.S)	Transistor	MATSUSHITA
Q61	2SC1685(R.S)	Transistor	MATSUSHITA
Q62	2SA564(R)	Transistor	MATSUSHITA
Q63	2SC1685(R.S)	Transistor	MATSUSHITA
Q64	2SA564(R)	Transistor	MATSUSHITA
Q65	2SC1685(R.S)	Transistor	MATSUSHITA
Q66	2SA564(R)	Transistor	MATSUSHITA
Q67	2SA564(R)	Transistor	MATSUSHITA
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D25	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
D32	MA165	Diode	MATSUSHITA
D33	MA165	Diode	MATSUSHITA
D34	MA165	Diode	MATSUSHITA
D35	MA165	Diode	MATSUSHITA
D36	MA165	Diode	MATSUSHITA
D37	MA165	Diode	MATSUSHITA
D38	MA165	Diode	MATSUSHITA
D39	MA165	Diode	MATSUSHITA
D40	MA165	Diode	MATSUSHITA
R1	QRD161J-472	CR	4.7 K 1/6 W
R2	QRD161J-103	CR	10 K 1/6 W
R3	QRD161J-103	CR	10 K 1/6 W
R4	QRD161J-222	CR	2.2 K 1/6 W
R5	QRD161J-181	CR	180 1/6 W
R6	QRD161J-221	CR	220 1/6 W
R7	QRD161J-471	CR	470 1/6 W
R8	QRD161J-392	CR	3.9 1/6 W
R9	QRD161J-471	CR	470 1/6 W
R10	QRD161J-471	CR	470 1/6 W
R11	QRD161J-122	CR	1.2 K 1/6 W
R12	QRD161J-122	CR	1.2 1/6 W
R13	QRD161J-182	CR	1.8 K 1/6 W
R14	QRD161J-103	CR	10 K 1/6 W
R15	QRD161J-472	CR	4.7 K 1/6 W
R16	QRD161J-103	CR	10 K 1/6 W
R17	QRD161J-103	CR	10 K 1/6 W
R18	QRD161J-222	CR	2.2 K 1/6 W
R19	QRD161J-181	CR	180 1/6 W
R20	QRD161J-221	CR	220 1/6 W
R21	QRD161J-471	CR	470 1/6 W
R22	QRD161J-392	CR	3.9 K 1/6 W
R23	QRD161J-471	CR	470 1/6 W
R24	QRD161J-471	CR	470 1/6 W
R25	QRD161J-122	CR	1.2 K 1/6 W
R26	QRD161J-122	CR	1.2 K 1/6 W
R27	QRD161J-182	CR	1.8 K 1/6 W
R28	QRD161J-103	CR	10 K 1/6 W
R29	QRD161J-821	CR	820 1/6 W
R30	QRD161J-821	CR	820 1/6 W
R31	QRD161J-221	CR	220 1/6 W
R33	QRD161J-102	CR	1 K 1/6 W
R34	QRD161J-333	CR	33 K 1/6 W
R35	QRD161J-104	CR	100 K 1/6 W
R36	QRD161J-102	CR	1 K 1/6 W
R37	QRD161J-222	CR	2.2 K 1/6 W
R38	QRD161J-471	CR	470 1/6 W
R39	QRD161J-222	CR	2.2 K 1/6 W
R40	QRD161J-472	CR	4.7 K 1/6 W
R41	QRD161J-222	CR	2.2 K 1/6 W
R42	QRD161J-471	CR	470 1/6 W

Symbol No.	Part No.	Part Name	Description
R43	QRD161J-103	CR	10 K 1/6 W
R44	QRD161J-103	CR	10 K 1/6 W
R45	QRD161J-104	CR	100 K 1/6 W
R46	QRD161J-471	CR	470 1/6 W
R47	QRD161J-392	CR	3.9 K 1/6 W
R48	QRD161J-820	CR	82 1/6 W
R49	QRD161J-471	CR	470 1/6 W
R50	QRD161J-122	CR	1.2 K 1/6 W
R51	QRD161J-122	CR	1.2 K 1/6 W
R52	QRD161J-471	CR	470 1/6 W
R53	QRD161J-392	CR	3.9 K 1/6 W
R54	QRD161J-820	CR	82 1/6 W
R55	QRD161J-471	CR	470 1/6 W
R56	QRD161J-122	CR	1.2 K 1/6 W
R57	QRD161J-122	CR	1.2 K 1/6 W
R58	QRD161J-221	CR	220 1/6 W
R59	QRD161J-221	CR	220 1/6 W
R60	QRD161J-221	CR	220 1/6 W
R61	QRD161J-472	CR	4.7 K 1/6 W
R62	QRD161J-221	CR	220 1/6 W
R63	QRD161J-472	CR	4.7 K 1/6 W
R64	QRD161J-222	CR	220 1/6 W
R65	QRD161J-472	CR	4.7 K 1/6 W
R66	QRD161J-222	CR	220 1/6 W
R67	QRD161J-472	CR	4.7 K 1/6 W
R68	QRD161J-103	CR	10 K 1/6 W
R69	QRD161J-103	CR	10 K 1/6 W
R71	QRD161J-103	CR	10 K 1/6 W
R72	–	–	
R73	QRD161J-221	CR	220 1/6 W
R74	QRD161J-182	CR	1.8 K 1/6 W
R75	QRD161J-222	CR	2.2 K 1/6 W
R76	QRD161J-822	CR	8.2 K 1/6 W
R77	–	–	
R78	QRD161J-221	CR	220 1/6 W
R79	QRD161J-182	CR	1.8 K 1/6 W
R80	QRD161J-222	CR	2.2 K 1/6 W
R81	QRD161J-822	CR	8.2 K 1/6 W
R92	QRD161J-221	CR	220 1/6 W
R94	QRD161J-221	CR	220 1/6 W
R95	QRD161J-472	CR	4.7 K 1/6 W
R96	QRD161J-152	CR	1.5 K 1/6 W
R97	QRD161J-221	CR	220 1/6 W
R98	QRD161J-221	CR	220 1/6 W
R99	QRD161J-472	CR	4.7 K 1/6 W
R100	QRD161J-152	CR	1.5 K 1/6 W
R101	QRD161J-152	CR	1.5 K 1/6 W
R102	QRD161J-471	CR	470 1/6 W
R103	QRD161J-104	CR	100 K 1/6 W
R104	QRD161J-102	CR	1 K 1/6 W
R105	QRD161J-471	CR	470 1/6 W
R106	QRD161J-392	CR	3.9 K 1/6 W
R107	QRD161J-100	CR	10 1/6 W
R108	QRD161J-122	CR	1.2 K 1/6 W
R109	QRD161J-122	CR	1.2 K 1/6 W
R110	QRD161J-103	CR	10 K 1/6 W
R111	QRD161J-472	CR	4.7 K 1/6 W
R112	QRD161J-104	CR	100 K 1/6 W
R113	QRD161J-221	CR	220 1/6 W
R114	QRD161J-222	CR	2.2 K 1/6 W
R115	QRD161J-471	CR	470 1/6 W
R116	QRD161J-222	CR	2.2 K 1/6 W
R117	QRD161J-472	CR	4.7 K 1/6 W
R118	QRD161J-473	CR	47 K 1/6 W
R119	QRD161J-221	CR	220 1/6 W
R120	QRD161J-472	CR	4.7 K 1/6 W
R121	QRD161J-561	CR	560 1/6 W
R122	QRD161J-222	CR	2.2 K 1/6 W
R123	QRD161J-221	CR	220 1/6 W
R124	–	–	
R125	–	–	
R126	QRD161J-103	CR	10 K 1/6 W
R127	QRD161J-103	CR	10 K 1/6 W
R128	QRD161J-332	CR	3.3 K 1/6 W
R129	QRD161J-471	CR	470 1/6 W
R130	QRD161J-153	CR	15 K 1/6 W
R131	QRD161J-103	CR	10 K 1/6 W
R132	QRD161J-182	CR	1.8 K 1/6 W
R133	QRD161J-332	CR	3.3 K 1/6 W
R134	QRD161J-471	CR	470 1/6 W
R135	QRD161J-153	CR	15 K 1/6 W
R136	QRD161J-103	CR	10 K 1/6 W
R137	QRD161J-182	CR	1.8 K 1/6 W
R138	QRD161J-332	CR	3.3 K 1/6 W
R139	QRD161J-471	CR	470 1/6 W
R140	QRD161J-273	CR	27 K 1/6 W
R141	QRD161J-561	CR	560 1/6 W
R142	QRD161J-153	CR	15 K 1/6 W
R143	QRD161J-103	CR	10 K 1/6 W
R144	QRD161J-182	CR	1.8 K 1/6 W
R148	QRD161J-123	CR	12 K 1/6 W
R149	QRD161J-183	CR	18 K 1/6 W
R150	QRD161J-472	CR	4.7 K 1/6 W
R151	QRD161J-123	CR	12 K 1/6 W
R152	QRD161J-183	CR	18 K 1/6 W
R153	QRD161J-472	CR	4.7 K 1/6 W
R182	QRD161J-221	CR	220 1/6 W
R183	QRD161J-221	CR	220 1/6 W
R184	QRD161J-221	CR	220 1/6 W
R186	QRD161J-221	CR	220 1/6 W
R187	QRD161J-221	CR	220 1/6 W
R188	QRD161J-221	CR	220 1/6 W
R190	QRD161J-221	CR	220 1/6 W
R191	QRD161J-221	CR	220 1/6 W
R192	QRD161J-221	CR	220 1/6 W
R194	QRD161J-221	CR	220 1/6 W
R195	QRD161J-221	CR	220 1/6 W
R196	QRD161J-221	CR	220 1/6 W
R198	QRD161J-823	CR	82 K 1/6 W
R199	QRD161J-823	CR	82 K 1/6 W
R200	QRD161J-823	CR	82 K 1/6 W
R201	QRD161J-823	CR	82 K 1/6 W
R202	QRD161J-823	CR	82 K 1/6 W
R203	QRD161J-823	CR	82 K 1/6 W
R204	QRD161J-823	CR	82 K 1/6 W
R205	QRD161J-823	CR	82 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R206	QRD161J-823	CR	82 K 1/6 W
R207	QRD161J-823	CR	82 K 1/6 W
R208	QRD161J-823	CR	82 K 1/6 W
R209	QRD161J-823	CR	82 K 1/6 W
R210	QRD161J-823	CR	82 K 1/6 W
R211	QRD161J-823	CR	82 K 1/6 W
R212	QRD161J-823	CR	82 K 1/6 W
R213	QRD161J-823	CR	82 K 1/6 W
R214	QRD161J-561	CR	560 1/6 W
R215	QRD161J-563	CR	56 K 1/6 W
R216	QRD161J-103	CR	10 K 1/6 W
R217	QRD161J-472	CR	4.7 K 1/6 W
R218	QRD161J-221	CR	220 1/6 W
R219	QRD161J-561	CR	560 1/6 W
R220	QRD161J-563	CR	56 K 1/6 W
R221	QRD161J-103	CR	10 K 1/6 W
R222	QRD161J-472	CR	4.7 K 1/6 W
R223	QRD161J-103	CR	10 K 1/6 W
R224	QRD161J-223	CR	22 K 1/6 W
R225	QRD161J-823	CR	82 K 1/6 W
R226	QRD161J-332	CR	3.3 K 1/6 W
R227	QRD161J-471	CR	470 1/6 W
R228	QRD161J-123	CR	12 K 1/6 W
R229	QRD161J-183	CR	18 K 1/6 W
R230	QRD161J-182	CR	1.8 K 1/6 W
R231	QRD161J-221	CR	220 1/6 W
R232	QRD161J-823	CR	82 K 1/6 W
R233	QRD161J-103	CR	10 K 1/6 W
R234	QRD161J-561	CR	560 1/6 W
R235	QRD161J-563	CR	56 K 1/6 W
R236	QRD161J-103	CR	10 K 1/6 W
R237	QRD161J-472	CR	4.7 K 1/6 W
R238	QRD161J-103	CR	10 K 1/6 W
R239	QRD161J-223	CR	22 K 1/6 W
R240	QRD161J-823	CR	82 K 1/6 W
R241	QRD161J-332	CR	3.3 K 1/6 W
R242	QRD161J-471	CR	470 1/6 W
R243	QRD161J-273	CR	27 K 1/6 W
R244	QRD161J-561	CR	560 1/6 W
R245	QRD161J-123	CR	12 K 1/6 W
R246	QRD161J-183	CR	18 K 1/6 W
R247	QRD161J-182	CR	1.8 K 1/6 W
R248	QRD161J-221	CR	220 1/6 W
R249	QRD161J-823	CR	82 K 1/6 W
R250	QRD161J-561	CR	560 1/6 W
R251	QRD161J-563	CR	56 K 1/6 W
R252	QRD161J-103	CR	10 K 1/6 W
R253	QRD161J-472	CR	4.7 K 1/6 W
R254	QRD161J-103	CR	10 K 1/6 W
R255	QRD161J-223	CR	22 K 1/6 W
R256	QRD161J-823	CR	82 K 1/6 W
R257	QRD161J-332	CR	3.3 K 1/6 W
R258	QRD161J-271	CR	270 1/6 W
R259	QRD161J-123	CR	12 K 1/6 W
R260	QRD161J-183	CR	18 K 1/6 W
R261	QRD161J-182	CR	1.8 K 1/6 W
R262	QRD161J-221	CR	220 1/6 W
R263	QRD161J-823	CR	82 K 1/6 W
R264	QRD161J-104	CR	100 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R265	QRD161J-103	CR	10 K 1/6 W
R266	QRD161J-103	CR	10 K 1/6 W
R267	QRD161J-102	CR	1 K 1/6 W
R268	QRD161J-333	CR	33 K 1/6 W
R269	QRD161J-103	CR	10 K 1/6 W
R270	QRD161J-332	CR	3.3 K 1/6 W
R271	QRD161J-822	CR	8.2 K 1/6 W
R272	QRD161J-182	CR	1.8 K 1/6 W
R273	QRD161J-473	CR	47 K 1/6 W
R274	QRD161J-182	CR	1.8 K 1/6 W
R275	QRD161J-123	CR	12 K 1/6 W
R276	QRD161J-153	CR	15 K 1/6 W
R277	–	–	
R278	QRD161J-103	CR	10 K 1/6 W
R279	QRD161J-103	CR	10 K 1/6 W
R280	QRD161J-104	CR	100 K 1/6 W
R283	QRD161J-104	CR	100 K 1/6 W
R284	QRD161J-103	CR	10 K 1/6 W
R285	QRD161J-104	CR	100 K 1/6 W
R286	QRD161J-104	CR	100 K 1/6 W
R287	QRD161J-103	CR	10 K 1/6 W
R288	QRD161J-104	CR	100 K 1/6 W
R289	QRD161J-103	CR	10 K 1/6 W
R290	QRD161J-103	CR	10 K 1/6 W
R291	QRD161J-104	CR	100 K 1/6 W
R292	QRD161J-104	CR	100 K 1/6 W
R293	QRD161J-104	CR	100 K 1/6 W
R294	QRD161J-104	CR	100 K 1/6 W
R295	QRD161J-104	CR	100 K 1/6 W
R296	QRD161J-104	CR	100 K 1/6 W
R297	QRD161J-104	CR	100 K 1/6 W
R298	QRD161J-104	CR	100 K 1/6 W
R299	QRD161J-221	CR	220 1/6 W
R300	QVPB613-501	VR	500
R301	QVPB613-502	VR	5 K CK RY SHIFT
R302	QVPB613-501	VR	500 CK BY SHIFT
R303	QVPB613-502	VR	5 K CK BY GAIN
R304	QVPB613-501	VR	500 K CL SHIFT
R305	QVPB613-502	VR	5 K K CL GAIN
R306	QVPB613-501	VR	500 KILLER BL
R307	QVPB613-501	VR	500 KEY BL
R308	QVPB613-102	VR	1 K KILL SLICE
R309	QVPB613-102	VR	1 K KEY SLICE
R310	QVPB613-502	VR	5 K SOFT SENT.
R311	QVPB613-502	VR	5 K BO. MIN.
R314	QVPB613-202	VR	2 K D CL GAIN
R316	QVPB613-102	VR	1 K D SLICE
R317	–	–	
R318	QVPB613-502	VR	5 K D GAIN
R319	QVPB613-501	VR	500 BO Y GAIN
R320	QVPB613-501	VR	500 BO RY GAIN
R321	QVPB613-501	VR	500 BO BY GAIN
R322	QVPB613-102	VR	1 K BO BL
R326	QVPB613-502	VR	5 K 0.4 ADJ
R327	–	–	
R328	QVPB613-501	VR	500 D Y GAIN
R329	QVPB613-501	VR	500 D RY GAIN
R330	QVPB613-501	VR	500 D BY GAIN

Symbol No.	Part No.	Part Name	Description
R331	QVPB613-102	VR	1 K D BL
R332	QRD161J-273	CR	27 K
R351	QRD161J-472	CR	4.7 K
R352	QRD161J-221	CR	220
R353	QRD161J-103	CR	10 K
R354	QRD161J-103	CR	10 K
C1	QER41CM-476	E Cap	47 16 V
C2	QCZ0206-104	C Cap	0.1
C3	QCZ0206-104	C Cap	0.1
C4	QEPC1HM-105	E Cap	1 50 V
C5	QER41CM-476	E Cap	47 16 V
C6	QCZ0206-104	C Cap	0.1
C7	QER41CM-476	E Cap	47 16 V
C8	QCZ0206-104	C Cap	0.1
C9	QCZ0206-104	C Cap	0.1
C10	QER41CM-106	E Cap	10 25 V
C11	QER41CM-476	E Cap	47 16 V
C12	QCZ0206-104	C Cap	0.1
C13	QCZ0206-104	C Cap	0.1
C14	QEPC1HM-105	E Cap	1 50 V
C15	QER41CM-476	E Cap	47 16 V
C16	QCZ0206-104	C Cap	0.1
C17	QER41CM-476	E Cap	47 16 V
C18	QCZ0206-104	C Cap	0.1
C20	QCZ0206-104	C Cap	0.1
C21	QER41EM-106	E Cap	10 25 V
C22	QCZ0206-104	C Cap	0.1
C23	QER41CM-476	E Cap	47 16 V
C24	QCZ0206-104	C Cap	0.1
C25	QCZ0206-104	C Cap	0.1
C26	QER41CM-476	E Cap	47 16 V
C27	QER41CM-476	E Cap	47 16 V
C28	QCZ0206-104	C Cap	0.1
C29	QCZ0206-104	C Cap	0.1
C30	QCZ0206-104	C Cap	0.1
C31	QCZ0206-104	C Cap	0.1
C32	QCZ0206-104	C Cap	0.1
C33	QCZ0206-104	C Cap	0.1
C34	QER41CM-476	E Cap	47 16 V
C35	QCZ0206-104	C Cap	0.1
C36	QCZ0206-104	C Cap	0.1
C37	QCZ0206-104	C Cap	0.1
C38	QER41CM-476	E Cap	47 16 V
C39	QEPC1HM-105	NP Cap	1 50 V
C40	QEPC1HM-105	NP Cap	1 50 V
C41	QER41CM-476	E Cap	47 16 V
C42	QER41CM-476	E Cap	47 16 V
C43	QER41CM-476	E Cap	47 16 V
C44	QER41CM-476	E Cap	47 16 V
C45	QER41CM-476	E Cap	47 16 V
C46	QER41CM-476	E Cap	47 16 V
C47	QEPC1HM-105	E Cap	1 50 V
C48	–	–	
C49	QEPC1HM-105	E Cap	1 50 V
C50	QER41CM-476	E Cap	47 16 V

Symbol No.	Part No.	Part Name	Description
C51	QEPC1HM-105	NP Cap	1 50 V
C52	QEPC1HM-105	NP Cap	1 50 V
C53	QEPC1HM-105	NP Cap	1 50 V
C54	QCZ0206-104	C Cap	0.1
C55	QCZ0206-104	C Cap	0.1
C56	QCZ0206-104	C Cap	0.1
C57	QCZ0206-104	C Cap	0.1
C58	QER41CM-476	E Cap	47 16 V
C59	QER41CM-476	E Cap	47 16 V
C60	QEPC1HM-105	NP Cap	1 50 V
C61	QER41CM-476	E Cap	47 16 V
C62	QCZ0206-104	C Cap	0.1
C63	QER41CM-476	E Cap	47 16 V
C64	QEPC1HM-105	E Cap	1 50 V
C65	QER41CM-476	E Cap	47 16 V
C66	QER41CM-476	E Cap	47 16 V
C67	QER41CM-476	E Cap	47 16 V
C68	QER41CM-476	E Cap	47 16 V
C70	QEPC0JM-476	NP Cap	47 6.3 V
C71	QEPC0JM-476	NP Cap	47 6.3 V
C80	QER41CM-476	E Cap	47 16 V
C81	QEPC1HM-105	NP Cap	1 50 V
C82	QER41CM-476	E Cap	47 16 V
C83	QER41EM-106	E Cap	10 25 V
C84	QER41EM-106	E Cap	10 25 V
C85	QER41CM-476	E Cap	47 16 V
C86	QER41EM-106	E Cap	10 25 V
C87	QER41EM-106	E Cap	10 25 V
C88	QER41CM-476	E Cap	47 16 V
C89	QER41EM-106	E Cap	10 25 V
C90	QER41EM-106	E Cap	10 25 V
C91	QER41EM-106	E Cap	10 25 V
C92	QER41EM-106	E Cap	10 25 V
C93	QER41CM-476	E Cap	47 16 V
C94	QER41CM-476	E Cap	47 16 V
C95	QER41CM-476	E Cap	47 16 V
C96	QER41CM-476	E Cap	47 16 V
C97	QCZ0206-104	C Cap	0.1
C98	QER41CM-476	E Cap	47 16 V
C99	QER41CM-476	E Cap	47 16 V
C100	QCZ0206-104	C Cap	0.1
C101	QER41CM-476	E Cap	47 16 V
C102	QETA1AM-477	E Cap	470 10 V
C103	QER41CM-476	E Cap	47 16 V
C104	QEX41CM-156	E Cap	15 16 V
C105	–	–	
C106	–	–	
C107	–	–	
C109	QER41CM-106	E Cap	10 25 V
C111	QER41CM-476	E Cap	47 16 V
C112	QCZ0206-104	C Cap	0.1
C113	QER41CM-476	E Cap	47 16 V
C114	QCZ0206-104	C Cap	0.1
C115	QCZ0206-104	C Cap	0.1
C116	QCZ0206-104	C Cap	0.1
C117	QCZ0206-104	C Cap	0.1
C118	QCZ0206-104	C Cap	0.1
C119	QCZ0206-104	C Cap	0.1
C120	QCZ0206-104	C Cap	0.1

Symbol No.	Part No.	Part Name	Description
C121	QCZ0206-104	C Cap	0.1
C123	QCZ0206-104	C Cap	0.1
C124	QCZ0206-104	C Cap	0.1
C125	QCZ0206-104	C Cap	0.1
C126	QCZ0206-104	C Cap	0.1
C127	QCZ0206-104	C Cap	0.1
C128	QCZ0206-104	C Cap	0.1
C130	QCZ0206-104	C Cap	0.1
C131	QCZ0206-104	C Cap	0.1
C132	QCZ0206-104	C Cap	0.1
C133	QCZ0206-104	C Cap	0.1
C134	QCZ0206-104	C Cap	0.1
C135	QCZ0206-104	C Cap	0.1
C137	QCZ0206-104	C Cap	0.1
C138	QCZ0206-104	C Cap	0.1
C139	QCZ0206-104	C Cap	0.1
C140	QCZ0206-104	C Cap	0.1
C141	QCZ0206-104	C Cap	0.1
C144	QCZ0206-104	C Cap	0.1
C145	QCZ0206-104	C Cap	0.1
C146	QCZ0206-104	C Cap	0.1
C147	QCZ0206-104	C Cap	0.1
C148	QCZ0206-104	C Cap	0.1
C149	QCZ0206-104	C Cap	0.1
C150	QCZ0206-104	C Cap	0.1
C151	QCZ0206-104	C Cap	0.1
C152	QCZ0206-104	C Cap	0.1
C154	QER41CM-476	E Cap	47 16 V
C155	QER41CM-476	E Cap	47 16 V
C156	QER41CM-476	E Cap	47 16 V
C157	QER41CM-476	E Cap	47 16 V
C158	QER41CM-476	E Cap	47 16 V
C159	QER41CM-476	E Cap	47 16 V
C160	QCZ0206-104	C Cap	0.1
C161	QCZ0206-104	C Cap	0.1
C162	QCZ0206-104	C Cap	0.1
C170	QCS11HJ-820	C Cap	82 P
C171	QCS11HJ-820	C Cap	82 P
C172	QCS11HJ-561	C Cap	560 P
C173	QCS11HJ-391	C Cap	390 P
C174	QCS11HJ-561	C Cap	560 P
C175–182	QER41CM-476	E Cap	47 16 V
C212	QCZ0206-104	C Cap	0.1
DL1	SCV1568-001	Delay Line	240 nsec
DL2	SCV1568-001	Delay Line	240 nsec
DL3	SCV1568-001	Delay Line	240 nsec
J1	SCV1148-001	Connector	
J2	SCV1148-001	Connector	

Symbol No.	Part No.	Part Name	Description
CBM1, 2, 6, 7, 9, 10, 12, 14 – 16			
	CBMC4353-00B	**CLAMP CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCT03CH-470	C Cap	47 P 50 V
CBM8, 11, 13			
	CBMC4393-00B	**MASK CBM**	
Q1	2SC2812(L5.6)	Transistor	SANYO
Q2	2SA1179(M5.6)	Transistor	SANYO
Q3	2SA1179(M5.6)	Transistor	SANYO
Q4	2SC2812(L5.6)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
CBM3 – 5			
	CBMC4406-00A	**CLAMP 2 CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
CBM17 – 19			
	CBMC4394-00A	**CP04 CBM**	
Q1	SC2814(F4.5)	Transistor	SANYO
Q2	SC2814(F4.5)	Transistor	SANYO
Q3	SC2814(F4.5)	Transistor	SANYO
Q4	SC2814(F4.5)	Transistor	SANYO
Q5	SC2814(F4.5)	Transistor	SANYO
Q6	SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V

7.10 WF board assembly 10

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Symbol No.	Part No.	Part Name	Description
IC1	TC40H004P	IC	TOSHIBA
IC2	NJM4558DD	IC	JRC
IC4	TC4053BP	IC	TOSHIBA
IC5	NJM4558DD	IC	JRC
IC6	NJM082D	IC	JRC
IC15	TC4013BAP	IC	TOSHIBA
IC16	NJM4558DD	IC	JRC
IC17	NJM4558DD	IC	JRC
IC18	TC4053BP	IC	TOSHIBA
IC19	AN6914	IC	MATSUSHITA
IC20	NJM4558DD	IC	JRC
IC21	BA6110	IC	ROHM
IC22	BA6110	IC	ROHM
IC23	BA6110	IC	ROHM
IC29	NJM4558DD	IC	JRC
IC30	NJM4558DD	IC	JRC
IC31	TC4011BP	IC	TOSHIBA
IC32	TC4011BP	IC	TOSHIBA
IC33	TC4053BP	IC	TOSHIBA
IC34	NJM4558DD	IC	JRC
IC35	TC4053BP	IC	TOSHIBA
IC36	TC4053BP	IC	TOSHIBA
IC37	NJM082D	IC	JRC
IC38	TC4053BP	IC	TOSHIBA
IC43	TC4053BP	IC	TOSHIBA
IC48	TC4001BP	IC	TOSHIBA
IC49	NJM082D	IC	JRC
IC50	NJM082D	IC	JRC
IC51	NJM082D	IC	JRC
IC52	TC4053BP	IC	TOSHIBA
IC55	TA78L005AP	IC	TOSHIBA
IC56	NJM79L05A	IC	JRC
IC57	TC4053BP	IC	TOSHIBA
IC61	–	–	
IC62	NJM4558DD	IC	JRC
IC65	BA6110	IC	ROHM
IC66	NJM4560DD	IC	JRC
IC67	TC4053BP	IC	TOSHIBA
IC68	TC4051BP	IC	TOSHIBA
IC69	TC4051BP	IC	TOSHIBA
IC70	TC4051BP	IC	TOSHIBA
IC71	TC4051BP	IC	TOSHIBA
IC72	NJM082D	IC	JRC
IC73	NJM082D	IC	JRC
IC74	NJM082D	IC	JRC
IC75	TC4053BP	IC	TOSHIBA
IC77	NJM082D	IC	JRC
IC78	NJM082D	IC	JRC
IC80	TC4053BP	IC	TOSHIBA
IC81	TC4053BP	IC	TOSHIBA
IC82	AN6914	IC	MATSUSHITA
IC83	TC4053BP	IC	TOSHIBA
IC84	AN6914	IC	MATSUSHITA
IC85	AN6914	IC	MATSUSHITA
IC87	TC4053BP	IC	TOSHIBA

Symbol No.	Part No.	Part Name	Description
Q1	2SA929(F)	Transistor	SANYO
Q2	2SK163(M.N)	FET	NEC
Q3	2SA929(F)	Transistor	SANYO
Q4	2SK163(M.N)	FET	NEC
Q5	2SA929(F)	Transistor	SANYO
Q6	2SK163(M.N)	FET	NEC
Q7	2SA929(F)	Transistor	SANYO
Q8	–	–	
Q9	2SA929(F)	Transistor	SANYO
Q10	2SC1570NP(F)	Transistor	SANYO
Q11	2SC1570NP(F)	Transistor	SANYO
Q12	2SC1570NP(F)	Transistor	SANYO
Q13	2SA929(F)	Transistor	SANYO
Q14	2SA929(F)	Transistor	SANYO
Q15	2SA929(F)	Transistor	SANYO
Q16	2SC1570NP(F)	Transistor	SANYO
Q17	2SC1570NP(F)	Transistor	SANYO
Q18	2SA929(F)	Transistor	SANYO
Q19	2SA929(F)	Transistor	SANYO
Q20	2SC1570NP(F)	Transistor	SANYO
Q21	2SC1570NP(F)	Transistor	SANYO
Q22	2SA929(F)	Transistor	SANYO
Q23	2SA929(F)	Transistor	SANYO
Q24	2SC1570NP(F)	Transistor	SANYO
Q25	2SC1570NP(F)	Transistor	SANYO
Q26	2SC1570NP(F)	Transistor	SANYO
Q27	2SC1570NP(F)	Transistor	SANYO
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	–	–	
D5	MA165	Diode	MATSUSHITA
D6	–	–	
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
R1	QRD161J-103	CR	10 K 1/6 W
R2	QRD161J-103	CR	10 K 1/6 W
R3	QRD161J-103	CR	10 K 1/6 W
R4	QRD161J-103	CR	10 K 1/6 W
R5	QRD161J-103	CR	10 K 1/6 W
R6	QRD161J-103	CR	10 K 1/6 W
R7	QRD161J-103	CR	10 K 1/6 W
R8	QRD161J-103	CR	10 K 1/6 W

Symbol No.	Part No.	Part Name	Description	
R9	QRD161J-103	CR	10 K	1/6 W
R10	QRD161J-103	CR	10 K	1/6 W
R11	QRD161J-103	CR	10 K	1/6 W
R12	QRD161J-103	CR	10 K	1/6 W
R13	QRD161J-103	CR	10 K	1/6 W
R14	QRD161J-103	CR	10 K	1/6 W
R15	QRD161J-103	CR	10 K	1/6 W
R16	QRD161J-103	CR	10 K	1/6 W
R17	QRD161J-102	CR	1 K	1/6 W
R18	QRD161J-102	CR	1 K	1/6 W
R19	QRD161J-683	CR	68 K	1/6 W
R20	QRD161J-683	CR	68 K	1/6 W
R21	QRD161J-104	CR	100 K	1/6 W
R22	QRD161J-103	CR	10 K	1/6 W
R23	QRD161J-222	CR	2.2 K	1/6 W
R24	QRD161J-333	CR	33 K	1/6 W
R25	QRD161J-472	CR	4.7 K	1/6 W
R26	QRD161J-472	CR	4.7 K	1/6 W
R27	QRD161J-153	CR	15 K	1/6 W
R28	QRD161J-102	CR	1 K	1/6 W
R29	QRD161J-102	CR	1 K	1/6 W
R30	QRD161J-154	CR	150 K	1/6 W
R31	QRD161J-153	CR	15 K	1/6 W
R32	QRD161J-473	CR	47 K	1/6 W
R33	QRD161J-333	CR	33 K	1/6 W
R34	QRD161J-103	CR	10 K	1/6 W
R35	QRD161J-103	CR	10 K	1/6 W
R36	QRD161J-103	CR	10 K	1/6 W
R37	QRD161J-822	CR	8.2 K	1/6 W
R38	QRD161J-470	CR	470	1/6 W
R39	QRD161J-470	CR	100 K	1/6 W
R40	QRD161J-222	CR	4.7 K	1/6 W
R41	QRD161J-472	CR	22 K	1/6 W
R42	QRD161J-223	CR	10 K	1/6 W
R43	QRD161J-103	CR	10 K	1/6 W
R44	QRD161J-103	CR	10 K	1/6 W
R45	QRD161J-103	CR	10 K	1/6 W
R46	QRD161J-103	CR	10 K	1/6 W
R47	QRD161J-222	CR	2.2 K	1/6 W
R48	QRD161J-103	CR	10 K	1/6 W
R49	QRD161J-105	CR	1 M	1/6 W
R50	QRD161J-222	CR	2.2 K	1/6 W
R51	QRD161J-222	CR	2.2 K	1/6 W
R52	QRD161J-222	CR	2.2 K	1/6 W
R53	QRD161J-222	CR	2.2 K	1/6 W
R54	QRD161J-682	CR	6.8 K	1/6 W
R55	QRD161J-682	CR	6.8 K	1/6 W
R56	QRD161J-102	CR	1 K	1/6 W
R57	QRD161J-103	CR	10 K	1/6 W
R58	QRD161J-103	CR	10 K	1/6 W
R59	QRD161J-103	CR	10 K	1/6 W
R60	QRD161J-103	CR	10 K	1/6 W
R61	QRD161J-103	CR	10 K	1/6 W
R62	QRD161J-103	CR	10 K	1/6 W
R63	QRD161J-103	CR	10 K	1/6 W
R64	QRD161J-103	CR	10 K	1/6 W
R65	QRD161J-103	CR	10 K	1/6 W
R66	QRD161J-103	CR	10 K	1/6 W
R67	QRD161J-102	CR	1 K	1/6 W

Symbol No.	Part No.	Part Name	Description	
R68	QRD161J-102	CR	1 K	1/6 W
R69	QRD161J-683	CR	68 K	1/6 W
R70	QRD161J-683	CR	68 K	1/6 W
R71	QRD161J-104	CR	100 K	1/6 W
R72	QRD161J-103	CR	10 K	1/6 W
R73	QRD161J-222	CR	2.2 K	1/6 W
R74	QRD161J-333	CR	33 K	1/6 W
R75	QRD161J-472	CR	4.7 K	1/6 W
R76	QRD161J-472	CR	4.7 K	1/6 W
R77	QRD161J-333	CR	33 K	1/6 W
R78	QRD161J-102	CR	1 K	1/6 W
R79	QRD161J-102	CR	1 K	1/6 W
R80	QRD161J-154	CR	150 K	1/6 W
R81	QRD161J-333	CR	33 M	1/6 W
R93	QRD161J-103	CR	10 K	1/6 W
R94	QRD161J-103	CR	10 K	1/6 W
R95	QRD161J-103	CR	10 K	1/6 W
R96	QRD161J-103	CR	10 K	1/6 W
R97	QRD161J-472	CR	4.7 K	1/6 W
R98	QRD161J-224	CR	220 K	1/6 W
R100	QRD161J-222	CR	2.2 K	1/6 W
R101	QRD161J-222	CR	2.2 K	1/6 W
R102	QRD161J-103	CR	10 K	1/6 W
R103	QRD161J-102	CR	1 K	1/6 W
R104	QRD161J-102	CR	1 K	1/6 W
R105	QRD161J-154	CR	150 K	1/6 W
R106	QRD161J-103	CR	10 K	1/6 W
R107	QRD161J-473	CR	47 K	1/6 W
D108	QRD161J-103	CR	10 K	1/6 W
R109	QRD161J-224	CR	220 K	1/6 W
R110	QRD161J-680	CR	68	1/6 W
R111	QRD161J-472	CR	4.7 K	1/6 W
R112	QRD161J-472	CR	4.7 K	1/6 W
R113	QRD161J-472	CR	4.7 K	1/6 W
R114	QRD161J-472	CR	4.7 K	1/6 W
R115	QRD161J-472	CR	4.7 K	1/6 W
R116	QRD161J-472	CR	4.7 K	1/6 W
R117	QRD161J-472	CR	4.7 K	1/6 W
R118	QRD161J-472	CR	4.7 K	1/6 W
R122	QRD161J-223	CR	22 K	1/6 W
R123	QRD161J-223	CR	22 K	1/6 W
R124	QRD161J-681	CR	680	1/6 W
R125	QRD161J-222	CR	2.2 K	1/6 W
R126	QRD161J-103	CR	10 K	1/6 W
R127	QRD161J-273	CR	27 K	1/6 W
R128	QRD161J-103	CR	10 K	1/6 W
R129	QRD161J-103	CR	10 K	1/6 W
R130	QRD161J-222	CR	2.2 K	1/6 W
R131	QRD161J-682	CR	6.8 K	1/6 W
R132	QRD161J-103	CR	10 K	1/6 W
R133	QRD161J-103	CR	10 K	1/6 W
R134	QRD161J-123	CR	12 K	1/6 W
R135	QRD161J-103	CR	10 K	1/6 W
R136	QRD161J-153	CR	15 K	1/6 W
R137	QRD161J-103	CR	10 K	1/6 W
R138	QRD161J-103	CR	10 K	1/6 W
R139	QRD161J-103	CR	10 K	1/6 W
R140	QRD161J-103	CR	10 M	1/6 W

Symbol No.	Part No.	Part Name	Description
R141	QRD161J-103	CR	10 K 1/6 W
R142	QRD161J-103	CR	10 K 1/6 W
R143	QRD161J-103	CR	10 K 1/6 W
R144	QRD161J-123	CR	12 K 1/6 W
R145	QRD161J-103	CR	10 K 1/6 W
R146	QRD161J-153	CR	15 K 1/6 W
R147	QRD161J-103	CR	10 K 1/6 W
R148	QRD161J-103	CR	10 K 1/6 W
R149	QRD161J-103	CR	10 K 1/6 W
R150	QRD161J-103	CR	10 K 1/6 W
R151	QRD161J-103	CR	10 K 1/6 W
R152	QRD161J-103	CR	10 K 1/6 W
R153	QRD161J-223	CR	22 K 1/6 W
R154	QRD161J-822	CR	8.2 K 1/6 W
R155	QRD161J-822	CR	8.2 K 1/6 W
R156	QRD161J-223	CR	22 K 1/6 W
R157	QRD161J-681	CR	680 1/6 W
R158	QRD161J-822	CR	8.2 K 1/6 W
R159	QRD161J-681	CR	680 1/6 W
R160	QRD161J-472	CR	4.7 K 1/6 W
R161	QRD161J-272	CR	2.7 K 1/6 W
R162	QRD161J-474	CR	470 K 1/6 W
R163	QRD161J-472	CR	4.7 K 1/6 W
R164	QRD161J-272	CR	2.7 K 1/6 W
R165	QRD161J-474	CR	470 K 1/6 W
R166	QRD161J-103	CR	10 K 1/6 W
R167	QRD161J-103	CR	10 K 1/6 W
R168	QRD161J-103	CR	10 K 1/6 W
R169	QRD161J-103	CR	10 K 1/6 W
R170	QRD161J-103	CR	10 K 1/6 W
R171	QRD161J-103	CR	10 K 1/6 W
R172	QRD161J-103	CR	10 K 1/6 W
R173	QRD161J-103	CR	10 K 1/6 W
R174	QRD161J-103	CR	10 K 1/6 W
R175	QRD161J-103	CR	10 K 1/6 W
R176	QRD161J-103	CR	10 K 1/6 W
R177	QRD161J-103	CR	10 K 1/6 W
R178	QRD161J-103	CR	10 K 1/6 W
R179	QRD161J-103	CR	10 K 1/6 W
R180	QRD161J-103	CR	10 K 1/6 W
R181	QRD161J-103	CR	10 K 1/6 W
R182	QRD161J-103	CR	10 K 1/6 W
R183	QRD161J-103	CR	10 K 1/6 W
R184	QRD161J-223	CR	22 K 1/6 W
R185	QRD161J-103	CR	10 K 1/6 W
R186	QRD161J-223	CR	22 K 1/6 W
R187	QRD161J-103	CR	10 K 1/6 W
R188	QRD161J-223	CR	22 K 1/6 W
R189	QRD161J-103	CR	10 K 1/6 W
R190	QRD161J-222	CR	2.2 K 1/6 W
R191	QRD161J-222	CR	2.2 K 1/6 W
R192	QRD161J-222	CR	2.2 K 1/6 W
R193	QRD161J-222	CR	2.2 K 1/6 W
R194	QRD161J-222	CR	2.2 K 1/6 W
R195	QRD161J-222	CR	2.2 K 1/6 W
R196	QRD161J-222	CR	2.2 K 1/6 W
R197	QRD161J-222	CR	2.2 K 1/6 W
R198	QRD161J-222	CR	2.2 K 1/6 W
R199	QRD161J-222	CR	2.2 K 1/6 W
R200	QRD161J-222	CR	2.2 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R201	QRD161J-222	CR	2.2 K 1/6 W
R202	QRD161J-332	CR	3.3 K 1/6 W
R203	QRD161J-103	CR	10 K 1/6 W
R204	QRD161J-332	CR	3.3 K 1/6 W
R205	QRD161J-103	CR	10 K 1/6 W
R206	QRD161J-332	CR	3.3 K 1/6 W
R207	QRD161J-103	CR	10 K 1/6 W
R208	QRD161J-102	CR	1 K 1/6 W
R210	QVPB613-204	VR	200 K H SAW TOP LEV
R211	QVPB613-204	VR	200 K H TRI CENTER
R212	QVPB613-502	VR	200 K H WAVE GAIN
R213	QVPB613-204	VR	200 K H PARAB GAIN
R214	QVPB613-502	VR	5 K H PARAB TOP FOLLOW
R215	QVPB613-204	VR	200 K V SAW TOP LEV
R216	QVPB613-204	VR	200 K V TRI CENTER
R217	QVPB613-502	VR	5 K V WAVE GAIN
R218	–	–	
R219	–	–	
R220	QVPB613-103	VR	10 K CONE TOP LEV
R221	QVPB613-102	VR	1 K
R222	QVPB613-103	VR	10 K
R223	QVPB613-103	VR	10 K CONE BIAS
R224	QVPB613-103	VR	10 K F LIMIT L
R225	QVPB613-103	VR	10 K F LIMIT H
R226	QVPB613-103	VR	10 K V PST B GATE
R227	QVPB613-103	VR	10 K H PST B GATE
R228	QVPB613-103	VR	10 K V PST W GATE
R229	QVPB613-103	VR	10 K H PST W GATE
R230	QVPB613-103	VR	10 K V B GATE
R231	QVPB613-103	VR	10 K H B GATE
R232	QVPB613-103	VR	10 K V W GATE
R233	QVPB613-103	VR	10 K H W GATE
R234	QVPB613-103	VR	10 K INV PST W GATE
R235	QVPB613-103	VR	10 K INV B GATE
R236	QVPB613-103	VR	10 K INV W GATE
R237	QVPB613-103	VR	10 K K SFT CENT.
R238	QVPB613-103	VR	10 K BKGD B. MIN
R239	QVPB613-103	VR	10 K BKGD SFT CENT.
R240	QVPB613-102	VR	1 K
R241–248	QRD161J-221	CR	220 1/6 W
R250	QRD161J-103	CR	10 K 1/6 W
R251	QRD161J-471	CR	470 1/6 W
R252	QRD161J-103	CR	10 K 1/6 W
R253	QRD161J-103	CR	10 K 1/6 W
R254	QRD161J-822	CR	8.2 K 1/6 W
R255	QRD161J-103	CR	10 K 1/6 W
R256	QRD161J-103	CR	10 K 1/6 W
R257	QRD161J-153	CR	15 K 1/6 W
R258	QRD161J-221	CR	220 1/6 W
R259	QRD161J-221	CR	220 1/6 W
R260	QRD161J-683	CR	68 K 1/6 W
R261	QRD161J-103	CR	10 K 1/6 W
R262	QRD161J-104	CR	100 K 1/6 W
R263	QRD161J-224	CR	220 K 1/6 W
R264	QVPB613-203	VR	20 K V PARAB GAIN
R265	QVPB613-103	VR	10 K V PARAB TOB CURVE
R266	QRD161J-333	CR	33 K 1/6 W
R268	QVPB613-103	VR	10 K H TRI TOP LEV
R269	QRD161J-103	CR	10 K 1/6 W
R270	QRD161J-103	CR	10 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R271	QRD161J-334	CR	330 K 1/6 W
R272	QRD161J-104	CR	100 K 1/6 W
R273	QVPB613-202	VR	2 K H INV BIAS
R274	QRD161J-103	CR	10 K 1/6 W
R275	QRD161J-103	CR	10 K 1/6 W
R276	QRD161J-103	CR	10 K 1/6 W
R277	QRD161J-103	CR	10 K 1/6 W
R279	QVPB613-202	VR	2 K V INV BIAS
R280	QRD161J-223	CR	22 K 1/6 W
R281	QRD161J-472	CR	4.7 K 1/6 W
C1	QCZ0206-104	C Cap	0.1
C2	QCZ0206-104	C Cap	0.1
C3	QCZ0206-104	C Cap	0.1
C4	QEPC1HM-105	NP Cap	1 50 V
C5	QEPC1HM-105	NP Cap	1 50 V
C6	QCZ0206-104	C Cap	0.1
C7	QCZ0206-104	C Cap	0.1
C8	QEN41HJ-103	MY Cap	0.01 50 V
C9	QCS11HJ-221	C Cap	220 P 50 V
C10	QFN41HJ-102	MY Cap	1000 P 50 V
C11	QFN41HJ-102	MY Cap	1000 P 50 V
C12	QCS11HJ-331	C Cap	330 P 50 V
C13	–	–	
C14	QFN41HJ-103	MY Cap	0.01 50 V
C15	QFN41HJ-103	MY Cap	0.01 50 V
C17	QCZ0206-104	C Cap	0.1
C18	–	–	
C19	QCS11HJ-470	C Cap	47 P 50 V
C20	–	–	
C21	–	–	
C22	QCZ0206-104	C Cap	0.1
C23	QCZ0206-104	C Cap	0.1
C24	QCZ0206-104	C Cap	0.1
C25	QEPC1CM-105	NP Cap	1 50 V
C26	QEPC1CM-105	NP Cap	1 50 V
C27	QCZ0206-104	C Cap	0.1
C28	QCZ0206-104	C Cap	0.1
C29	QFN41HJ-103	MY Cap	0.01 50 V
C30	QFN41HJ-184	MY Cap	0.18 50 V
C31	–	–	
C32	–	–	
C33	–	–	
C34	–	–	
C35	–	–	
C36	QCZ0206-104	C Cap	0.1
C37	QCS11HJ-470	C Cap	47 P
C38	–	–	
C39	QEPC1CM-106	NP Cap	10 16 V
C40	QCZ0206-104	C Cap	0.1
C41	QCS11HJ-101	C Cap	100 P
C42	QCS11HJ-101	C Cap	100 P
C43	QCS11HJ-101	C Cap	100 P
C44	QCS11HJ-101	C Cap	100 P
C45	QEPC1HM-105	NP Cap	1 50 V
C46	QCS11HJ-101	C Cap	100 P
C47	QCZ0206-104	C Cap	0.1
C48	QCZ0206-104	C Cap	0.1
C49	QCZ0206-104	C Cap	0.1
C50	QEPC1HM-105	NP Cap	1 50 V

Symbol No.	Part No.	Part Name	Description
C51	QEPC1HM-105	E Cap	1 50 V
C52	QEPC1HM-105	E Cap	1 50 V
C53	QEPC1HM-105	E Cap	1 50 V
C54	QEPC1HM-105	E Cap	1 50 V
C55	QEPC1HM-105	E Cap	1 50 V
C56	QEPC1HM-105	E Cap	1 50 V
C57	QEPC1HM-105	E Cap	1 50 V
C60	QCZ0206-104	C Cap	0.1
C61	QCZ0206-104	C Cap	0.1
C62	QCZ0206-104	C Cap	0.1
C63	–	–	
C64	–	–	
C65	–	–	
C66	QCZ0206-104	C Cap	0.1
C67	QCZ0206-104	C Cap	0.1
C68	QCZ0206-104	C Cap	0.1
C69	QEPC1CM-106	E Cap	10 16 V
C70	QCZ0206-104	C Cap	0.1
C71	QCZ0206-104	C Cap	0.1
C72	QER41CM-476	E Cap	47 16 V
C73	QER41CM-476	E Cap	47 16 V
C74	QCZ0206-104	C Cap	0.1
C75	QCZ0206-104	C Cap	0.1
C76	QCZ0206-104	C Cap	0.1
C77	QCZ0206-104	C Cap	0.1
C78	QER41CM-476	E Cap	47 16 V
C79	QER41CM-476	E Cap	47 16 V
C80	QER41CM-476	E Cap	47 16 V
C81	QER41CM-476	E Cap	47 16 V
C82	–	–	
C83	QCZ0206-104	C Cap	0.1
C84	–	–	
C85	QER41CM-476	E Cap	47 16 V
C86	QCZ0206-104	C Cap	0.1
C87	QCZ0206-104	C Cap	0.1
C88 – C89	QER41CM-476	E Cap	47 16 V
C90	QCZ0206-104	C Cap	0.1
C91	QCZ0206-104	C Cap	0.1
C92	QCZ0206-104	C Cap	0.1
C93	QCZ0206-104	C Cap	0.1
C94	QER41CM-476	E Cap	47 16 V
C95	QER41CM-476	E Cap	47 16 V
C96	QER41CM-476	E Cap	47 16 V
C97	QER41CM-476	E Cap	47 16 V
C98	QCZ0206-104	C Cap	0.1
C99	QCZ0206-104	C Cap	0.1
C100	QER41CM-476	E Cap	47 16 V
C101	QER41CM-476	E Cap	47 16 V
C103	QCZ0206-104	C Cap	0.1
C104	QCZ0206-104	C Cap	0.1
C105	QER41CM-476	E Cap	47 16 V
C107	QCZ0206-104	C Cap	0.1
C109	QER41CM-476	E Cap	47 16 V
C110	QCZ0206-104	C Cap	0.1
C111	QCZ0206-104	C Cap	0.1
C112	QER41CM-476	E Cap	47 16 V
C113	QER41CM-476	E Cap	47 16 V
C114	QCZ0206-104	C Cap	0.1
C115	QCZ0206-104	C Cap	0.1

Symbol No.	Part No.	Part Name	Description	
C116	QER41CM-476	E Cap	47	16 V
C117	QER41CM-476	E Cap	47	16 V
C118	QCZ0206-104	C Cap	0.1	
C119	QCZ0206-104	C Cap	0.1	
C120	QER41CM-476	E Cap	47	16 V
C121	QER41CM-476	E Cap	47	16 V
C122	QCZ0206-104	C Cap	0.1	
C123	QCZ0206-104	C Cap	0.1	
C124	QER41CM-476	E Cap	47	16 V
C125	QER41CM-476	E Cap	47	16 V
C126	QCZ0206-104	C Cap	0.1	
C127	QCZ0206-104	C Cap	0.1	
C128	QCZ0206-104	C Cap	0.1	
C129	QCZ0206-104	C Cap	0.1	
C130	QER41CM-476	E Cap	47	16 V
C131	QER41CM-476	E Cap	47	16 V
C132	QCZ0206-104	C Cap	0.1	
C133	QCZ0206-104	C Cap	0.1	
C134	QER41CM-476	E Cap	47	16 V
C135	QER41CM-476	E Cap	47	16 V
C136	QCZ0206-104	C Cap	0.1	
C137	QCZ0206-104	C Cap	0.1	
C138	QCZ0206-104	C Cap	0.1	
C139	QCZ0206-104	C Cap	0.1	
C140	QER41CM-476	E Cap	47	16 V
C141	QER41CM-476	E Cap	47	16 V
C142	QCZ0206-104	C Cap	0.1	
C143	QCZ0206-104	C Cap	0.1	
C144	QER41CM-476	E Cap	47	16 V
C145	QER41CM-476	E Cap	47	16 V
C146	QCZ0206-104	C Cap	0.1	
C147	QCZ0206-104	C Cap	0.1	
C148	QCZ0206-104	C Cap	0.1	
C149	QCZ0206-104	C Cap	0.1	
C150	QER41CM-476	E Cap	47	16 V
C151	QER41CM-476	E Cap	47	16 V
C152	QCZ0206-104	C Cap	0.1	
C153	QCZ0206-104	C Cap	0.1	
C154	QER41CM-476	E Cap	47	16 V
C155	QER41CM-476	E Cap	47	16 V
C156	QCZ0206-104	C Cap	0.1	
C157	QCZ0206-104	C Cap	0.1	
C158	QER41CM-476	E Cap	47	16 V
C159	QER41CM-476	E Cap	47	16 V
C160	QCZ0206-104	C Cap	0.1	
C161	QCZ0206-104	C Cap	0.1	
C162	QER41CM-476	E Cap	47	16 V
C163	QER41CM-476	E Cap	47	16 V
C164	QER41CM-476	E Cap	47	16 V
C165	QER41CM-476	E Cap	47	16 V
C166	QER41CM-476	E Cap	47	16 V
C167	QER41CM-476	E Cap	47	16 V
C168	QCZ0206-104	C Cap	0.1	
C169	QCZ0206-104	C Cap	0.1	
C170	QCZ0206-104	C Cap	0.1	
C171	QCZ0206-104	C Cap	0.1	
C172	QCZ0206-104	C Cap	0.1	
C173	QCZ0206-104	C Cap	0.1	
C174	QER41CM-476	E Cap	47	16 V

Symbol No.	Part No.	Part Name	Description	
C175	QCZ0206-104	C Cap	0.1	
C176	QER41CM-476	E Cap	47	16 V
C177	QCZ0206-104	C Cap	0.1	
C178	QCZ0206-104	C Cap	0.1	
C179	QCZ0206-104	C Cap	0.1	
C180	QCZ0206-104	C Cap	0.1	
C181	QCZ0206-104	C Cap	0.1	
C182	QCZ0206-104	C Cap	0.1	
C183	QCZ0206-104	C Cap	0.1	
C184	QCZ0206-104	C Cap	0.1	
C185	QCZ0206-104	C Cap	0.1	
C200	QEPC1HM-105	NP Cap	1	50 V
C201	QCS11HJ-101	C Cap	100 P	
C202	QEPC1HM-105	NP Cap	1	50 V
C203	QCS11HJ-5R0	C Cap	5 P	
C204	QEPC1HM-106	NP Cap	10	50 V
C205	QCS11HJ-101	C Cap	100 P	
C206	QCZ0206-104	C Cap	0.1	
C207	QCZ0206-104	C Cap	0.1	
RA1	QRB081J-103	Resister Network	10 K	x 8
RA2	QRB041J-103	Resister Network	10 K	x 4
CN4	SCV1197-090	Connector	90 Pin	
CBM1–8	**CBMC4352-00B**	**SFT CBM**		
IC1	TC4053BF	IC	TOSHIBA	
IC2	TC4053BF	IC	TOSHIBA	
D1	MA152K	Diode	MATSUSHITA	
D2	MA152K	Diode	MATSUSHITA	
D3	MA152K	Diode	MATSUSHITA	
C1	NCF21EZ-104	C Cap	0.1	25 V
CBM9–16	**CBMC4351-00B**	**COMPA CBM**		
IC1	NJM1496M	IC	JRC	
Q1	2SC2814(F4.5)	Transistor	SANYO	
Q2	2SC2814(F4.5)	Transistor	SANYO	

Symbol No.	Part No.	Part Name	Description
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V
C5	NCF21EZ-104	C Cap	0.1 25 V
CBM17–24	**CBMC4353-00B**	**CLAMP CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCT03CH-470	C Cap	47 P 50 V
CBM25, 26, 27, 30	**CBMC4354-00B**	**AND CBM**	
Q1	2SC2812(L5.6)	Transistor	SANYO
Q2	2SA1179(M5.6)	Transistor	SANYO
Q3	2SA1179(M5.6)	Transistor	SANYO
Q4	2SC2812(L5.6)	Transistor	SANYO
Q5	2SC2812(L5.6)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
CBM28, 29, 31, 32	**CBMC4357-00B**	**OR CBM**	
Q1	2SA1179(M5.6)	Transistor	SANYO
Q2	2SC2812(L5.6)	Transistor	SANYO
Q3	2SC2812(L5.6)	Transistor	SANYO
Q4	2SA1179(M5.6)	Transistor	SANYO
Q5	2SA1179(M5.6)	Transistor	SANYO

Symbol No.	Part No.	Part Name	Description
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
CBM35	**CBMC4355-00A**	**VIDEO CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SC2814(F4.5)	Transistor	SANYO
Q3	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V

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Symbol No.	Part No.	Part Name	Description
IC1	TC4053BP	IC	TOSHIBA
IC2	TC4053BP	IC	TOSHIBA
IC3	TC4053BP	IC	TOSHIBA
IC4	TC4053BP	IC	TOSHIBA
IC5	TC4053BP	IC	TOSHIBA
IC6	TC4053BP	IC	TOSHIBA
IC7	TC4053BP	IC	TOSHIBA
IC8	TC4053BP	IC	TOSHIBA
IC9	NJM2068DD	IC	JRC
IC10	NJM2068DD	IC	JRC
IC11	TC4053BP	IC	TOSHIBA
IC12	TC4053BP	IC	TOSHIBA
IC13	TC4053BP	IC	TOSHIBA
IC14	TC4053BP	IC	TOSHIBA
IC15	NJM2068DD	IC	JRC
IC16	TC50H000P	IC	TOSHIBA
IC17	TC50H000P	IC	TOSHIBA
IC18	TA78L005AP	IC	TOSHIBA
Q1	2SA564(R)	Transistor	MATSUSHITA
Q2	2SC1685(R.S)	Transistor	MATSUSHITA
Q3	2SC1685(R.S)	Transistor	MATSUSHITA
Q4	2SC1685(R.S)	Transistor	MATSUSHITA
Q5	2SC1685(R.S)	Transistor	MATSUSHITA
Q6	2SA564(R)	Transistor	MATSUSHITA
Q7	2SC1685(R.S)	Transistor	MATSUSHITA
Q8	2SC1685(R.S)	Transistor	MATSUSHITA
Q9	2SC1685(R.S)	Transistor	MATSUSHITA
Q10	2SA564(R)	Transistor	MATSUSHITA
Q11	2SC1685(R.S)	Transistor	MATSUSHITA
Q12	2SC1685(R.S)	Transistor	MATSUSHITA
Q13	2SC1685(R.S)	Transistor	MATSUSHITA
Q14	2SA564(R)	Transistor	MATSUSHITA
Q15	–	–	
Q16	–	–	
Q17	2SB834(Y)	Transistor	TOSHIBA
Q18	2SA564(R)	Transistor	MATSUSHITA
Q19	2SC1685(R.S)	Transistor	MATSUSHITA
D1	HZS9C2L	Zener Diode	HITACHI
D2	HZS9C2L	Zener Diode	HITACHI
D3	HZS9C2L	Zener Diode	HITACHI
D4	HZS9C2L	Zener Diode	HITACHI
D5	HZS9C2L	Zener Diode	HITACHI
D6	HZS9C2L	Zener Diode	HITACHI
D7	HZS9C2L	Zener Diode	HITACHI
D8	HZS9C2L	Zener Diode	HITACHI
D9	HZS9C2L	Zener Diode	HITACHI
D10	HZS9C2L	Zener Diode	HITACHI
D11	HZS9C2L	Zener Diode	HITACHI
D12	HZS9C2L	Zener Diode	HITACHI
D13	HZS9C2L	Zener Diode	HITACHI

Symbol No.	Part No.	Part Name	Description
D14	HZS9C2L	Zener Diode	HITACHI
D15	HZS9C2L	Zener Diode	HITACHI
D16	HZS9C2L	Zener Diode	HITACHI
D17	HZS9C2L	Zener Diode	HITACHI
D18	HZS9C2L	Zener Diode	HITACHI
D19	HZS9C2L	Zener Diode	HITACHI
D20	HZS9C2L	Zener Diode	HITACHI
D21	HZS9C2L	Zener Diode	HITACHI
D22	HZS9C2L	Zener Diode	HITACHI
D23	HZS9C2L	Zener Diode	HITACHI
D24	HZS9C2L	Zener Diode	HITACHI
D25	HZS9C2L	Zener Diode	HITACHI
D26	HZS9C2L	Zener Diode	HITACHI
D27	HZS9C2L	Zener Diode	HITACHI
D28	HZS9C2L	Zener Diode	HITACHI
D29	HZS9C2L	Zener Diode	HITACHI
D30	HZS9C2L	Zener Diode	HITACHI
R1	QVPB613-103	VR	10 K DIF 1
R2	QVPB613-201	VR	200 FR Y GAIN
R3	QVPB613-201	VR	200 BO Y GAIN
R4	QVPB613-103	VR	10 K DIF 2
R5	QVPB613-201	VR	200 FR Y PED
R6	QVPB613-201	VR	200 TO Y GAIN
R7	QVPB613-103	VR	10 K DIF 3
R8	QVPB613-201	VR	200 BK Y GAIN
R9	QVPB613-201	VR	200 KBO Y GAIN
R10	QVPB613-103	VR	10 K DIF 4
R11	QVPB613-201	VR	200 BK Y PED
R12	QVPB613-201	VR	200 K Y GAIN
R13	QVPB613-103	VR	10 K DIF 5
R14	QVPB613-501	VR	500 EF Y GAIN
R15	QVPB613-501	VR	500 D Y GAIN
R16	QVPB613-103	VR	10 K DIF 6
R17	QVPB613-501	VR	500 PGM Y GAIN
R18	QVPB613-501	VR	500 PGM Y PED
R19	QVPB613-103	VR	10 K DIF 7
R20	QVPB613-201	VR	200 BKPV Y GAIN
R21	QVPB613-201	VR	200 BOPV Y GAIN
R22	QVPB613-103	VR	10 K DIF 8
R23	QVPB613-201	VR	200 BKPV Y PED
R24	QVPB613-201	VR	200 KYPV Y GAIN
R25	QVPB613-103	VR	10 K DIF 9
R26	QVPB613-501	VR	500 EFPV Y GAIN
R27	QVPB613-501	VR	500 DPV Y GAIN
R28	QVPB613-103	VR	10 K DIF 10
R29	QVPB613-501	VR	500 PVW Y GAIN
R30	QVPB613-501	VR	500 PVW Y PED
R31	QVPB613-501	VR	500 PGM SYNC
R32	QVPB613-501	VR	500 PVW SYNC
R41	QRD161J-221	CR	220 1/6 W
R42	QRD161J-331	CR	330 1/6 W
R43	QRD161J-221	CR	220 1/6 W
R44	QRD161J-331	CR	330 1/6 W
R45	QRD161J-221	CR	220 1/6 W
R46	QRD161J-331	CR	330 1/6 W

Symbol No.	Part No.	Part Name	Description
R47	QRD161J-221	CR	220 1/6 W
R48	QRD161J-331	CR	330 1/6 W
R49	QRD161J-221	CR	220 1/6 W
R50	QRD161J-331	CR	330 1/6 W
R51	QRD161J-221	CR	220 1/6 W
R52	QRD161J-331	CR	330 1/6 W
R53	QRD161J-221	CR	220 1/6 W
R54	QRD161J-331	CR	330 1/6 W
R55	QRD161J-221	CR	220 1/6 W
R56	QRD161J-331	CR	330 1/6 W
R57	QRD161J-221	CR	220 1/6 W
R58	QRD161J-221	CR	220 1/6 W
R59	QRD161J-221	CR	220 1/6 W
R60	QRD161J-221	CR	220 1/6 W
R61	QRD161J-221	CR	220 1/6 W
R62	QRD161J-222	CR	2.2 K 1/6 W
R63	QRD161J-122	CR	1.2 K 1/6 W
R64	QRD161J-273	CR	27 K 1/6 W
R65	QRD161J-103	CR	10 K 1/6 W
R66	QRD161J-472	CR	4.7 K 1/6 W
R67	QRD161J-472	CR	4.7 K 1/6 W
R68	QRD161J-122	CR	1.2 K 1/6 W
R69	QRD161J-273	CR	27 K 1/6 W
R70	QRD161J-103	CR	10 K 1/6 W
R71	QRD161J-221	CR	220 1/6 W
R72	QRD161J-331	CR	330 1/6 W
R73	QRD161J-221	CR	220 1/6 W
R74	QRD161J-331	CR	330 1/6 W
R75	QRD161J-392	CR	3.9 K 1/6 W
R76	QRD161J-332	CR	3.3 K 1/6 W
R77	QRD161J-221	CR	220 1/6 W
R78	QRD161J-331	CR	330 1/6 W
R79	QRD161J-221	CR	220 1/6 W
R80	QRD161J-331	CR	330 1/6 W
R81	QRD161J-221	CR	220 1/6 W
R82	QRD161J-221	CR	220 1/6 W
R83	QRD161J-474	CR	470 K 1/6 W
R84	QRD161J-122	CR	1.2 K 1/6 W
R85	QRD161J-273	CR	27 K 1/6 W
R86	QRD161J-103	CR	10 K 1/6 W
R87	QRD161J-221	CR	220 1/6 W
R88	QRD161J-221	CR	220 1/6 W
R89	–	–	
R90	–	–	
R91	–	–	
R92	QRD161J-472	CR	4.7 K 1/6 W
R93	QRD161J-221	CR	220 1/6 W
R94	QRD161J-472	CR	4.7 K 1/6 W
R95	QRD161J-221	CR	220 1/6 W
R101	QVPB613-103	VR	10 K DIF 11
R102	QVPB613-201	VR	200 FR R GAIN
R103	QVPB613-201	VR	200 BO R GAIN
R104	QVPB613-103	VR	10 K DIF 12
R105	QVPB613-201	VR	200 FR R PED
R106	QVPB613-201	VR	200 TO R GAIN
R107	QVPB613-103	VR	10 K DIF 13
R108	QVPB613-201	VR	200 BK R GAIN
R109	QVPB613-201	VR	200 KBO R GAIN
R110	QVPB613-103	VR	10 K DIF 14

Symbol No.	Part No.	Part Name	Description
R111	QVPB613-201	VR	200 BK R PED
R112	QVPB613-201	VR	200 K R GAIN
R113	QVPB613-103	VR	10 K DIF 15
R114	QVPB613-501	VR	500 EF R GAIN
R115	QVPB613-501	VR	500 D R GAIN
R116	QVPB613-103	VR	10 K DIF 16
R117	QVPB613-501	VR	500 PGM R GAIN
R118	QVPB613-501	VR	500 PGM R PED
R119	QVPB613-103	VR	10 K DIF 17
R120	QVPB613-201	VR	200 BKPV R GAIN
R121	QVPB613-201	VR	200 BOPV R GAIN
R122	QVPB613-103	VR	10 K DIF 18
R123	QVPB613-201	VR	200 BKPV R PED
R124	QVPB613-201	VR	200 KYPV R GAIN
R125	QVPB613-103	VR	10 K DIF 19
R126	QVPB613-501	VR	500 EFPV R GAIN
R127	QVPB613-501	VR	500 DPV R GAIN
R128	QVPB613-103	VR	10 K DIF 20
R129	QVPB613-501	VR	500 PVW R GAIN
R130	QVPB613-501	VR	500 PVW R PED
R141	QRD161J-221	CR	220 1/6 W
R142	QRD161J-331	CR	330 1/6 W
R143	QRD161J-221	CR	220 1/6 W
R144	QRD161J-331	CR	330 1/6 W
R145	QRD161J-221	CR	220 1/6 W
R146	QRD161J-331	CR	330 1/6 W
R147	QRD161J-221	CR	220 1/6 W
R148	QRD161J-331	CR	330 1/6 W
R149	QRD161J-221	CR	220 1/6 W
R150	QRD161J-331	CR	330 1/6 W
R151	QRD161J-221	CR	220 1/6 W
R152	QRD161J-331	CR	330 1/6 W
R153	QRD161J-221	CR	220 1/6 W
R154	QRD161J-331	CR	330 1/6 W
R155	QRD161J-221	CR	220 1/6 W
R156	QRD161J-331	CR	330 1/6 W
R157	QRD161J-221	CR	220 1/6 W
R158	QRD161J-221	CR	220 1/6 W
R159	QRD161J-221	CR	220 1/6 W
R160	QRD161J-221	CR	220 1/6 W
R161	QRD161J-221	CR	220 1/6 W
R162	QRD161J-222	CR	2.2 K 1/6 W
R163	QRD161J-122	CR	1.2 K 1/6 W
R164	QRD161J-273	CR	27 K 1/6 W
R165	QRD161J-103	CR	10 K 1/6 W
R166	QRD161J-272	CR	2.7 K 1/6 W
R167	QRD161J-183	CR	18 K 1/6 W
R168	QRD161J-122	CR	1.2 K 1/6 W
R169	QRD161J-273	CR	27 K 1/6 W
R170	QRD161J-103	CR	10 K 1/6 W
R171	QRD161J-221	CR	220 1/6 W
R172	QRD161J-331	CR	330 1/6 W
R173	QRD161J-221	CR	220 1/6 W
R174	QRD161J-331	CR	330 1/6 W
R177	QRD161J-221	CR	220 1/6 W
R178	QRD161J-331	CR	330 1/6 W
R179	QRD161J-221	CR	220 1/6 W
R180	QRD161J-331	CR	330 1/6 W
R181	QRD161J-221	CR	220 1/6 W

Symbol No.	Part No.	Part Name	Description
R182	QRD161J-221	CR	220 1/6 W
R183	QRD161J-474	CR	470 K 1/6 W
R184	QRD161J-122	CR	1.2 K 1/6 W
R185	QRD161J-273	CR	27 K 1/6 W
R186	QRD161J-103	CR	10 K 1/6 W
R187	QRD161J-221	CR	220 1/6 W
R188	QRD161J-221	CR	220 1/6 W
R201	QVPB613-103	VR	10 K DIF 21
R202	QVPB613-201	VR	200 FR B GAIN
R203	QVPB613-201	VR	200 BO B GAIN
R204	QVPB613-103	VR	10 K DIF 22
R205	QVPB613-201	VR	200 FR B PED
R206	QVPB613-201	VR	200 TO B GAIN
R207	QVPB613-103	VR	10 K DIF 23
R208	QVPB613-201	VR	200 BK B GAIN
R209	QVPB613-201	VR	200 KBO B GAIN
R210	QVPB613-103	VR	10 K DIF 24
R211	QVPB613-201	VR	200 BK B PED
R212	QVPB613-201	VR	200 K B GAIN
R213	QVPB613-103	VR	10 K DIF 25
R214	QVPB613-501	VR	500 EF B GAIN
R215	QVPB613-501	VR	500 D B GAIN
R216	QVPB613-103	VR	10 K DIF 26
R217	QVPB613-501	VR	500 PGM B GAIN
R218	QVPB613-501	VR	500 PGM B PED
R219	QVPB613-103	VR	10 K DIF 27
R220	QVPB613-201	VR	200 BKPV B GAIN
R221	QVPB613-201	VR	200 BOPV B GAIN
R222	QVPB613-103	VR	10 K DIF 28
R223	QVPB613-201	VR	200 BKPV B PED
R224	QVPB613-201	VR	200 KYPV B GAIN
R225	QVPB613-103	VR	10 K DIF 29
R226	QVPB613-501	VR	500 EFPV B GAIN
R227	QVPB613-501	VR	500 DPV B GAIN
R228	QVPB613-103	VR	10 K DIF 30
R229	QVPB613-501	VR	500 PVW B GAIN
R230	QVPB613-501	VR	500 PVW B PED
R241	QRD161J-221	CR	220 1/6 W
R242	QRD161J-331	CR	330 1/6 W
R243	QRD161J-221	CR	220 1/6 W
R244	QRD161J-331	CR	330 1/6 W
R245	QRD161J-221	CR	220 1/6 W
R246	QRD161J-331	CR	330 1/6 W
R247	QRD161J-221	CR	220 1/6 W
R248	QRD161J-331	CR	330 1/6 W
R249	QRD161J-221	CR	220 1/6 W
R250	QRD161J-331	CR	330 1/6 W
R251	QRD161J-221	CR	220 1/6 W
R252	QRD161J-331	CR	330 1/6 W
R253	QRD161J-221	CR	220 1/6 W
R254	QRD161J-331	CR	330 1/6 W
R255	QRD161J-221	CR	220 1/6 W
R256	QRD161J-331	CR	330 1/6 W
R257	QRD161J-221	CR	220 1/6 W
R258	QRD161J-221	CR	220 1/6 W
R259	QRD161J-221	CR	220 1/6 W
R260	QRD161J-221	CR	220 1/6 W
R261	QRD161J-221	CR	220 1/6 W
R262	QRD161J-222	CR	2.2 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R263	QRD161J-122	CR	1.2 K 1/6 W
R264	QRD161J-273	CR	27 K 1/6 W
R265	QRD161J-103	CR	10 K 1/6 W
R266	QRD161J-272	CR	2.7 K 1/6 W
R267	QRD161J-183	CR	18 K 1/6 W
R268	QRD161J-122	CR	1.2 K 1/6 W
R269	QRD161J-273	CR	27 K 1/6 W
R270	QRD161J-103	CR	10 K 1/6 W
R271	QRD161J-221	CR	220 1/6 W
R272	QRD161J-331	CR	330 1/6 W
R273	QRD161J-221	CR	220 1/6 W
R274	QRD161J-331	CR	330 1/6 W
R277	QRD161J-221	CR	220 1/6 W
R278	QRD161J-331	CR	330 1/6 W
R279	QRD161J-221	CR	220 1/6 W
R280	QRD161J-331	CR	330 1/6 W
R281	QRD161J-221	CR	220 1/6 W
R282	QRD161J-221	CR	220 1/6 W
R283	QRD161J-474	CR	470 K 1/6 W
R284	QRD161J-122	CR	1.2 K 1/6 W
R285	QRD161J-273	CR	27 K 1/6 W
R286	QRD161J-103	CR	10 K 1/6 W
R287	QRD161J-221	CR	220 1/6 W
R288	QRD161J-221	CR	220 1/6 W
R301	QRD161J-103	CR	10 K 1/6 W
R302	QRD161J-103	CR	10 K 1/6 W
R303	QRD161J-103	CR	10 K 1/6 W
R304	QRD161J-103	CR	10 K 1/6 W
R305	QRD161J-103	CR	10 K 1/6 W
R306	QRD161J-103	CR	10 K 1/6 W
R307	QRD161J-103	CR	10 K 1/6 W
R308	QRD161J-103	CR	10 K 1/6 W
R309	QRD161J-103	CR	10 K 1/6 W
R310	QRD161J-103	CR	10 K 1/6 W
R311	QRD161J-103	CR	10 K 1/6 W
R312	QRD161J-103	CR	10 K 1/6 W
R313	QRD161J-103	CR	10 K 1/6 W
R314	QRD161J-474	CR	470 K 1/6 W
R315	QRV141F-1001AY	MFR	1 K 1/6 W
R316	QRV141F-1502AY	MFR	15 K 1/6 W
R317	QRD161J-103	CR	10 K 1/6 W
R318	QRD161J-103	CR	10 K 1/6 W
R319	QRD161J-472	CR	4.7 K 1/6 W
R320	QRD161J-221	CR	220 1/6 W
R321	QRD161J-182	CR	1.8 K 1/6 W
R322	QRD161J-223	CR	22 K 1/6 W
R323	QRD161J-103	CR	10 K 1/6 W
R324	QRD161J-103	CR	10 K 1/6 W
R325	QRD161J-182	CR	1.8 K 1/6 W
R326	QRD161J-123	CR	12 K 1/6 W
R327	QRD161J-221	CR	220 1/6 W
R328	QRD161J-123	CR	12 K 1/6 W
R329	QRD161J-221	CR	220 1/6 W
R330	QRV141F-1001AY	MFR	1 K 1/6 W
R331	QRV141F-1502AY	MFR	15 K 1/6 W
R332	QRD161J-102	CR	1 K 1/6 W
R333	QRD161J-223	CR	22 K 1/6 W
R334	QRD161J-103	CR	10 K 1/6 W
R335	QRD161J-821	CR	820 1/6 W

Symbol No.	Part No.	Part Name	Description
R336	QRD161J-472	CR	4.7 K 1/6 W
R337	QRD161J-221	CR	220 1/6 W
R338	QRD161J-222	CR	2.2 K 1/6 W
R339	QRD161J-222	CR	2.2 K 1/6 W
R343	QRD161J-474	CR	470 K 1/6 W
R344	–	–	
R345	–	–	
R346	QRD161J-182	CR	1.8 K 1/6 W
R347	QRD161J-393	CR	39 K 1/6 W
R348	QRD161J-103	CR	10 K 1/6 W
R349	QRD161J-393	CR	39 K 1/6 W
R350	QRD161J-103	CR	10 K 1/6 W
R351	QRD161J-223	CR	22 K 1/6 W
R352	QRD161J-273	CR	27 K 1/6 W
R353	QRD161J-223	CR	22 K 1/6 W
R354	QRD161J-223	CR	22 K 1/6 W
R355	QRD161J-393	CR	39 K 1/6 W
R356	QRD161J-103	CR	10 K 1/6 W
R357	QRD161J-223	CR	22 K 1/6 W
R358	QRD161J-273	CR	27 K 1/6 W
R359	QRD161J-103	CR	10 K 1/6 W
R360	QRD161J-103	CR	10 K 1/6 W
R361	QRD161J-472	CR	4.7 K 1/6 W
R362	QRD161J-221	CR	220 1/6 W
R363	QRD161J-223	CR	22 K 1/6 W
R364	QRD161J-182	CR	1.8 K 1/6 W
R365	QRD161J-182	CR	1.8 K 1/6 W
R366	QRD161J-223	CR	22 K 1/6 W
R367	QRD161J-182	CR	1.8 K 1/6 W
R368	QRD161J-103	CR	10 K 1/6 W
R369	QRD161J-103	CR	10 K 1/6 W
R371	–	–	
R372	QVPB613-102	VR	1 K MIX DC
R373	QVPB613-102	VR	1 K MIX GAIN
R374	–	–	
R375	–	–	
R376	–	–	
R377	–	–	
R378	–	–	
R379	QVPB613-202	VR	2 K DSK DC
R380	QVPB613-102	VR	1 K KEY MIX DC
R381	QVPB613-102	VR	1 K KEY MIX GAIN
R382	QVPB613-502	VR	5 K
R383	QVPB613-102	VR	1 K FTB DC
R384	QVPB613-102	VR	1 K FTB GAIN
R390	QRD161J-474	CR	470 K 1/6 W
R391	QRD161J-474	CR	470 K 1/6 W
R392	QRD161J-103	CR	10 K 1/6 W
R393	QRD161J-103	CR	10 K 1/6 W
R394	QRD161J-222	CR	2.2 K 1/6 W
R395	QRD161J-222	CR	2.2 K 1/6 W
R396	QRD161J-182	CR	1.8 K 1/6 W
R397	QRD161J-682	CR	6.8 K 1/6 W
R398	QRD161J-182	CR	1.8 K 1/6 W
R399	QRD161J-103	CR	10 K 1/6 W
R400	QRD161J-392	CR	3.9 K 1/6 W
R401	QRV141F-3301AY	MFR	3.3 K 1/4 W
R402	QRV141F-5601AY	MFR	5.6 K 1/4 W
R403	QRD161J-563	CR	56 K 1/6 W
R404	QRD161J-224	CR	220 K 1/6 W
R405	QRD161J-224	CR	220 K 1/6 W
R406	QRD161J-471	CR	470 1/6 W
R407	QRD161J-561	CR	560 1/6 W
R408	QRD161J-471	CR	470 1/6 W
R409	QRD161J-561	CR	560 1/6 W
R410	QRD161J-100	CR	10 1/6 W
R411	QRD161J-100	CR	10 1/6 W
C1	QFN41HJ-104	MY Cap	0.1 50 V
C2	QFN41HJ-104	MY Cap	0.1 50 V
C5	QFN41HJ-104	MY Cap	0.1 50 V
C6	QFN41HJ-104	MY Cap	0.1 50 V
C7	QCS11HJ-270	C Cap	27 P
C8	QCS11HJ-150	C Cap	15 P
C9	QFN41HJ-104	MY Cap	0.1 50 V
C10	QFN41HJ-104	MY Cap	0.1 50 V
C11	–	–	
C12	–	–	
C13	QFN41HJ-104	MY Cap	0.1 50 V
C14	QFN41HJ-104	MY Cap	0.1 50 V
C15	QCS11HJ-270	C Cap	27 P
C16	–	–	
C17	QFN41HJ-104	MY Cap	0.1 50 V
C18	QFN41HJ-104	MY Cap	0.1 50 V
C19	–	–	
C20	–	–	
C21	QFN41HJ-104	MY Cap	0.1 50 V
C22	QFN41HJ-104	MY Cap	0.1 50 V
C23	–	–	
C24	–	–	
C25	QFN41HJ-104	MY Cap	0.1 50 V
C26	QFN41HJ-104	MY Cap	0.1 50 V
C27	QFN41HJ-104	MY Cap	0.1 50 V
C28	QFN41HJ-104	MY Cap	0.1 50 V
C29	QCZ0206-104	C Cap	0.1
C30	QFN41HJ-104	MY Cap	0.1 50 V
C31	QFN41HJ-104	MY Cap	0.1 50 V
C32	QCZ0206-104	C Cap	
C33	QFN41HJ-104	MY Cap	0.1 50 V
C34	QFN41HJ-104	MY Cap	0.1 50 V
C35	–	–	
C36	–	–	
C37	QER41CM-476	E Cap	47 16 V
C38	QFN41HJ-104	MY Cap	0.1 50 V
C39	QFN41HJ-104	MY Cap	0.1 50 V
C40	QCS11HJ-270	C Cap	27 P
C41	–	–	
C42	QFN41HJ-104	MY Cap	0.1 50 V
C43	QFN41HJ-104	MY Cap	0.1 50 V
C44	–	–	
C45	–	–	
C46	QFN41HJ-104	MY Cap	0.1 50 V
C47	QFN41HJ-104	MY Cap	0.1 50 V
C48	QFN41HJ-104	MY Cap	0.1 50 V
C49	QCZ0206-104	C Cap	0.1
C50	QFN41HJ-104	MY Cap	0.1 50 V
C51	QFN41HJ-104	MY Cap	0.1 50 V
C52	–	–	

Symbol No.	Part No.	Part Name	Description
C53	–	–	
C54	QFN41HJ-104	MY Cap	0.1 50 V
C55	QER41CM-476	E Cap	47 16 V
C56	QER41CM-476	E Cap	47 16 V
C57	QER41CM-476	E Cap	47 16 V
C58	QER41CM-476	E Cap	47 16 V
C59	QER41CM-476	E Cap	47 16 V
C60	QER41CM-476	E Cap	47 16 V
C71	QFN41HJ-104	MY Cap	0.1 50 V
C72	QFN41HJ-104	MY Cap	0.1 50 V
C73	–	–	
C74	–	–	
C75	QFN41HJ-104	MY Cap	0.1 50 V
C76	QFN41HJ-104	MY Cap	0.1 50 V
C77	QCS11HJ-270	C Cap	27 P
C78	QCS11HJ-150	C Cap	15 P
C79	QER41CM-476	E Cap	47 16 V
C80	QFN41HJ-104	MY Cap	0.1 50 V
C81	QFN41HJ-104	MY Cap	0.1 50 V
C82	QCS11HJ-270	C Cap	27 P
C83	QCS11HJ-270	C Cap	27 P
C85	QFN41HJ-104	MY Cap	0.1 50 V
C86	QFN41HJ-104	MY Cap	0.1 50 V
C87	QCS11HJ-270	C Cap	27 P
C88	–	–	
C89	QFN41HJ-104	MY Cap	0.1 50 V
C90	QFN41HJ-104	MY Cap	0.1 50 V
C91	–	–	
C92	–	–	
C93	QFN41HJ-104	MY Cap	0.1 50 V
C94	QFN41HJ-104	MY Cap	0.1 50 V
C95	–	–	
C96	–	–	
C97	QFN41HJ-104	MY Cap	0.1 50 V
C98	QFN41HJ-104	MY Cap	0.1 50 V
C99	QFN41HJ-104	MY Cap	0.1 50 V
C100	QFN41HJ-104	MY Cap	0.1 50 V
C101	QCZ0206-104	C Cap	0.1
C102	QFN41HJ-104	MY Cap	0.1 50 V
C103	QFN41HJ-104	MY Cap	0.1 50 V
C104	QCZ0206-104	C Cap	0.1
C105	QFN41HJ-104	MY Cap	0.1 50 V
C106	QFN41HJ-104	MY Cap	0.1 50 V
C107	–	–	
C108	–	–	
C109	QFN41HJ-104	MY Cap	0.1 50 V
C110	QFN41HJ-104	MY Cap	0.1 50 V
C111	QCS11HJ-270	C Cap	27 P
C112	–	–	
C113	QFN41HJ-104	MY Cap	0.1 50 V
C114	QFN41HJ-104	MY Cap	0.1 50 V
C115	–	–	
C116	–	–	
C117	QFN41HJ-104	MY Cap	0.1 50 V
C118	QFN41HJ-104	MY Cap	0.1 50 V
C119	QFN41HJ-104	MY Cap	0.1 50 V
C120	QCZ0206-104	C Cap	0.1
C121	QFN41HJ-104	MY Cap	0.1 50 V
C122	QFN41HJ-104	MY Cap	0.1 50 V

Symbol No.	Part No.	Part Name	Description
C123	–	–	
C124	–	–	
C125	QFN41HJ-104	MY Cap	0.1 50 V
C126	QER41CM-476	E Cap	47 16 V
C127	QER41CM-476	E Cap	47 16 V
C128	QER41CM-476	E Cap	47 16 V
C129	QER41CM-476	E Cap	47 16 V
C130	QER41CM-476	E Cap	47 16 V
C131	QER41CM-476	E Cap	47 16 V
C141	QFN41HJ-104	MY Cap	0.1 50 V
C142	QFN41HJ-104	MY Cap	0.1 50 V
C143	–	–	
C144	–	–	
C145	QFN41HJ-104	MY Cap	0.1 50 V
C146	QFN41HJ-104	MY Cap	0.1 50 V
C147	QCS11HJ-270	C Cap	27 P
C148	QCS11HJ-150	C Cap	15 P
C149	QER41CM-476	E Cap	47
C150	QFN41HJ-104	MY Cap	0.1 50 V
C151	QFN41HJ-104	MY Cap	0.1 50 V
C152	–	–	
C153	–	–	
C155	QFN41HJ-104	MY Cap	0.1 50 V
C156	QFN41HJ-104	MY Cap	0.1 50 V
C157	QCS11HJ-270	C Cap	27 P
C158	–	–	
C159	QFN41HJ-104	MY Cap	0.1 50 V
C160	QFN41HJ-104	MY Cap	0.1 50 V
C161	–	–	
C162	–	–	
C163	QFN41HJ-104	MY Cap	0.1 50 V
C164	QFN41HJ-104	MY Cap	0.1 50 V
C165	–	–	
C166	–	–	
C167	QFN41HJ-104	MY Cap	0.1 50 V
C168	QFN41HJ-104	MY Cap	0.1 50 V
C169	QFN41HJ-104	MY Cap	0.1 50 V
C170	QFN41HJ-104	MY Cap	0.1 50 V
C171	QCZ0206-104	C Cap	0.1
C172	QFN41HJ-104	MY Cap	0.1 50 V
C173	QFN41HJ-104	MY Cap	0.1 50 V
C174	QCZ0206-104	C Cap	0.1
C175	QFN41HJ-104	MY Cap	0.1 50 V
C176	QFN41HJ-104	MY Cap	0.1 50 V
C177	–	–	
C178	–	–	
C179	QFN41HJ-104	MY Cap	0.1 50 V
C180	QFN41HJ-104	MY Cap	0.1 50 V
C181	QCS11HJ-270	C Cap	27 P
C182	–	–	
C183	QFN41HJ-104	MY Cap	0.1 50 V
C184	QFN41HJ-104	MY Cap	0.1 50 V
C185	–	–	
C186	–	–	
C187	QFN41HJ-104	MY Cap	0.1 50 V
C188	QFN41HJ-104	MY Cap	0.1 50 V
C189	QFN41HJ-104	MY Cap	0.1 50 V
C190	QCZ0206-104	C Cap	0.1

Symbol No.	Part No.	Part Name	Description	
C191	QFN41HJ-104	MY Cap	0.1	50 V
C192	QFN41HJ-104	MY Cap	0.1	50 V
C193	–	–		
C194	–	–		
C195	QFN41HJ-104	MY Cap	0.1	50 V
C196	QER41CM-476	E Cap	47	16 V
C197	QER41CM-476	E Cap	47	16 V
C198	QER41CM-476	E Cap	47	16 V
C199	QER41CM-476	E Cap	47	16 V
C200	QER41CM-476	E Cap	47	16 V
C201	QER41CM-476	E Cap	47	16 V
C211	QFN41HJ-104	MY Cap	0.1	50 V
C212	QCZ0206-104	C Cap	0.1	
C213	QER61CM-476	E Cap	47	16 V
C214	QFN41HJ-104	MY Cap	0.1	50 V
C215	QCZ0206-104	C Cap	0.1	
C216	QEPC0JM-476	NP Cap	47	6.3 V
C217	QCZ0206-104	C Cap	0.1	
C218	QER41CM-476	E Cap	47	16 V
C219	QFN41HJ-104	MY Cap	0.1	50 V
C220	QFN41HJ-104	MY Cap	0.1	50 V
C221	QFN41HJ-104	MY Cap	0.1	50 V
C222	QFN41HJ-104	MY Cap	0.1	50 V
C223	QFN41HJ-104	MY Cap	0.1	50 V
C224	QFN41HJ-104	MY Cap	0.1	50 V
C225	QFN41HJ-104	MY Cap	0.1	50 V
C226	QCZ0206-104	C Cap	0.1	
C227	QER41CM-476	E Cap	47	16 V
C228	QFN41HJ-104	MY Cap	0.1	50 V
C229	QCZ0206-104	C Cap	0.1	
C230	QER41CM-476	E Cap	47	16 V
C231	QFN41HJ-104	MY Cap	0.1	50 V
C232	QER41CM-476	E Cap	47	16 V
C233	QFN41HJ-104	MY Cap	0.1	50 V
C234	QEPC0JM-476	NP Cap	47	6.3 V
C235	QCZ0206-104	C Cap	0.1	
C236	QER41EM-106	E Cap	10	25 V
C237	QER41EM-106	E Cap	10	25 V
C238	QER41EM-106	E Cap	10	25 V
C239	QER41EM-106	E Cap	10	25 V
C240	QER41EM-106	E Cap	10	25 V
C241	QER41EM-106	E Cap	10	25 V
C242	QCZ0206-104	C Cap	0.1	
C243	QEPC0JM-476	NP Cap	47	6.3 V
C244	QCZ0206-104	C Cap	0.1	
C245	QEPC0JM-476	NP Cap	47	6.3 V
C246	QCZ0206-104	C Cap	0.1	
C247	QEPC0JM-476	NP Cap	47	6.3 V
C248	QETA1CM-477	E Cap	470	16 V
C249	QETA1CM-477	E Cap	470	16 V
C250	QETA1CM-477	E Cap	470	16 V
C251	QER41CM-476	E Cap	47	16 V
C252	QER41CM-476	E Cap	47	16 V
C253	QER41CM-476	E Cap	47	16 V
C254	QER41CM-476	E Cap	47	16 V
C255	QCZ0206-104	C Cap	0.1	
C256	QCZ0206-104	C Cap	0.1	
C257	QER41EM-106	E Cap	10	25 V
C258	QER41EM-106	E Cap	10	25 V

Symbol No.	Part No.	Part Name	Description	
C259	QER41EM-106	E Cap	10	25 V
C260	QCZ0206-104	C Cap	0.1	
C261	QCZ0206-104	C Cap	0.1	
C262	QCZ0206-104	C Cap	0.1	
C263	QCZ0206-104	C Cap	0.1	
C264	QCZ0206-104	C Cap	0.1	
C265	QCZ0206-104	C Cap	0.1	
C266	QCZ0206-104	C Cap	0.1	
C267	QCZ0206-104	C Cap	0.1	
C268	QCZ0206-104	C Cap	0.1	
C269	QCZ0206-104	C Cap	0.1	
C270	QCZ0206-104	C Cap	0.1	
C271	QCZ0206-104	C Cap	0.1	
C272	QCZ0206-104	C Cap	0.1	
C273	QCZ0206-104	C Cap	0.1	
C274	QCZ0206-104	C Cap	0.1	
C275	QCZ0206-104	C Cap	0.1	
C276	QCZ0206-104	C Cap	0.1	
C277	QCZ0206-104	C Cap	0.1	
C278	QCZ0206-104	C Cap	0.1	
C279	QCZ0206-104	C Cap	0.1	
C280	QCZ0206-104	C Cap	0.1	
C281	QCZ0206-104	C Cap	0.1	
C282	QCZ0206-104	C Cap	0.1	
C283	QCZ0206-104	C Cap	0.1	
C284	QCZ0206-104	C Cap	0.1	
C285	QCZ0206-104	C Cap	0.1	
C286	QCZ0206-104	C Cap	0.1	
C287	QCZ0206-104	C Cap	0.1	
C288	QCZ0206-104	C Cap	0.1	
C289	QCZ0206-104	C Cap	0.1	
C290	QER41CM-476	E Cap	47	16 V
C291	QEPC0JM-476	NP Cap	47	6.3 V
C292	QEPC0JM-476	NP Cap	47	6.3 V
C293	QEPC0JM-476	NP Cap	47	6.3 V
C294	QEPC0JM-476	NP Cap	47	6.3 V
C295	QEPC0JM-476	NP Cap	47	6.3 V
C296	QEPC0JM-476	NP Cap	47	6.3 V
C297	QEPC0JM-476	NP Cap	47	6.3 V
C298	QEPC0JM-476	NP Cap	47	6.3 V
C299	QCS11HJ-270	C Cap	27 P	50 V
C300	QCS11HJ-180	C Cap	18 P	50 V
C301	QER41CM-476	E Cap	47	16 V
C302	QER41CM-476	E Cap	47	16 V
C303	QEX41CM-156	E Cap	15	16 V
C304	QEX41CM-156	E Cap	15	16 V
C305	QEX41CM-156	E Cap	15	16 V
C306	QEX41CM-156	E Cap	15	16 V
C307	QEX41CM-156	E Cap	15	16 V
C308	QEX41CM-156	E Cap	15	16 V
C309	QEX41CM-156	E Cap	15	16 V
C310	QEX41CM-156	E Cap	15	16 V
C311	QEX41CM-156	E Cap	15	16 V
C312	QEX41CM-156	E Cap	15	16 V
C313	QEX41CM-156	E Cap	15	16 V
C314	QEX41CM-156	E Cap	15	16 V
C315	QEX41CM-156	E Cap	15	16 V
C316	QEX41CM-156	E Cap	15	16 V
C317	QEX41CM-156	E Cap	15	16 V

Symbol No.	Part No.	Part Name	Description
C318	QEPC1HM-105	NP Cap	1 16 V
C319	QEPC1HM-106	NP Cap	10 16 V
C320	QCS11HJ-821	C Cap	820 P
C321	QCS11HJ-821	C Cap	820 P
J1	SCV1148-001	Connector	
J2	SCV1148-001	Connector	
J3	SCV1148-001	Connector	
CBM1–10	**CBMC4350-00B**	**EFF 1 CBM**	
IC1	NJM1496MT2	IC	JRC
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(E4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
Q5	2SC2814(F4.5)	Transistor	SANYO
Q6	2SC2814(F4.5)	Transistor	SANYO
Q7	2SC2814(F4.5)	Transistor	SANYO
Q8	2SK198(Q.R))	FET	MATSUSHITA
Q9	2SA1256(E4.5)	Transistor	SANYO
Q10	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
CBM11–30	**CBMC4366-00B**	**EFF 2 CBM**	
IC1	NJM1496M	IC	JRC
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(E4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
Q5	2SC2814(F4.5)	Transistor	SANYO
Q6	2SC2814(F4.5)	Transistor	SANYO
Q7	2SC2814(F4.5)	Transistor	SANYO
Q8	2SK198(Q.R)	FET	MATSUSHITA
Q9	2SA1256(E4.5)	Transistor	SANYO
Q10	2SC2814(F4.5)	Transistor	SANYO

Symbol No.	Part No.	Part Name	Description
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
CBM31–37, 41–47, 51–57	**CBMC4356-00A**	**CLCP CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
CBM38–40, 48–50, 58–60, 74	**CBMC4358-00B**	**CLVA CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	EFT	MATSUSHITA
Q3	2SC2814(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO
Q5	2SC2814(F4.5)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
CBM61–64, 66–68, 70–73	**CBMC4353-00B**	**CLAMP CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SK198(Q.R)	FET	MATSUSHITA
Q3	2SA1256(F4.5)	Transistor	SANYO
Q4	2SC2814(F4.5)	Transistor	SANYO

Symbol No.	Part No.	Part Name	Description
D1	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCT03CH-470	C Cap	47 P 50 V
CBM65, 69	**CBMC4393-00B**	**MASK CBM**	
Q1	2SC2812(L5.6)	Transistor	SANYO
Q2	2SA1179(M5.6)	Transistor	SANYO
Q3	2SA1179(M5.6)	Transistor	SANYO
Q4	2SC2812(L5.6)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V

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Symbol No.	Part No.	Part Name	Description
IC1	TC50H001P	IC	TOSHIBA
IC2	TC50H001P	IC	TOSHIBA
IC3	TC50H000P	IC	TOSHIBA
IC4	TC40H193P	IC	TOSHIBA
IC5	SCV0592-001	Function Module	JVC
IC6	SCV0270-001	Function Module	JVC
IC7	TC40H010P	IC	TOSHIBA
IC8	TA78L005AP	IC	TOSHIBA
IC9	AN614	IC	MATSUSHITA
IC10	AN614	IC	(NTSC only)
IC11	AN614	IC	MATSUSHITA
IC13	NJM311D	IC	JRC (NTSC only)
IC14	TC74HC40102P	IC	TOSHIBA(NTSC only)
IC15	UPD74HC74C	IC	NEC (NTSC only)
IC16	TC40H004P	IC	TOSHIBA(NTSC only)
IC17	NJM1496D	IC	JRC
IC18	AN614	IC	MATSUSHITA
IC19	AN614	IC	MATSUSHITA
IC20	TC4053BP	IC	TOSHIBA (PAL only)
Q1	2SC1685(R.S)	Transistor	MATSUSHITA
Q2	2SC1685(R.S)	Transistor	MATSUSHITA
Q3	2SC1685(R.S)	Transistor	MATSUSHITA
Q4	2SC1685(R.S)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q6	2SC1685(R.S)	Transistor	MATSUSHITA
Q7	2SC1685(R.S)	Transistor	MATSUSHITA
Q8	2SA564(R)	Transistor	MATSUSHITA
Q9	2SA564(R)	Transistor	MATSUSHITA
Q10	2SC1685(R.S)	Transistor	MATSUSHITA
Q11	2SA564(R)	Transistor	MATSUSHITA
Q12	2SC1685(R.S)	Transistor	MATSUSHITA
Q13	2SC1685(R.S)	Transistor	MATSUSHITA
Q14	2SC1685(R.S)	Transistor	MATSUSHITA
Q15	2SC1685(R.S)	Transistor	(NTSC only)
Q16	2SA564(R)	Transistor	MATSUSHITA
Q17	2SC1685(R.S)	Transistor	MATSUSHITA
Q18	2SC1685(R.S)	Transistor	MATSUSHITA
Q19	2SK163(M.N)	FET	NEC
Q20	2SA564(R)	Transistor	MATSUSHITA
Q21	2SC1685(R.S)	Transistor	MATSUSHITA
Q22	2SC1685(R.S)	Transistor	MATSUSHITA
Q23	2SC1685(R.S)	Transistor	MATSUSHITA
Q24	2SC1685(R.S)	Transistor	MATSUSHITA
Q25	2SC1685(R.S)	Transistor	MATSUSHITA
Q26	2SC1685(R.S)	Transistor	MATSUSHITA
Q27	2SK163(M.N)	FET	NEC
Q28	2SC1685(R.S)	Transistor	MATSUSHITA
Q29	2SC1685(R.S)	Transistor	MATSUSHITA
Q30	2SK163(M.N)	FET	NEC
Q31	2SA564(R)	Transistor	MATSUSHITA
Q32	2SC1685(R.S)	Transistor	MATSUSHITA
Q33	2SC1685(R.S)	Transistor	MATSUSHITA
Q34	2SC1685(R.S)	Transistor	MATSUSHITA
Q35	2SC1685(R.S)	Transistor	MATSUSHITA
Q36	2SA564(R)	Transistor	MATSUSHITA
Q37	2SC1685(R.S)	Transistor	MATSUSHITA
Q38	2SC1685(R.S)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
Q39	2SC1685(R.S)	Transistor	MATSUSHITA
Q40	2SC1685(R.S)	Transistor	MATSUSHITA
Q41	2SA564(R)	Transistor	MATSUSHITA
Q42	2SC1685(R.S)	Transistor	MATSUSHITA
Q43	2SC1685(R.S)	Transistor	MATSUSHITA
Q44	2SK163(M.N)	FET	NEC
Q45	2SA564(R)	Transistor	MATSUSHITA
Q46	2SC1685(R.S)	Transistor	MATSUSHITA
Q47	2SC1685(R.S)	Transistor	MATSUSHITA
Q48	2SC1685(R.S)	Transistor	MATSUSHITA
Q49	2SC1685(R.S)	Transistor	MATSUSHITA
Q50	2SK163(M.N)	FET	NEC
Q51	2SC1685(R.S)	Transistor	MATSUSHITA
Q52	2SC1685(R.S)	Transistor	MATSUSHITA
Q53	2SC1685(R.S)	Transistor	(NTSC only)
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	HZ3B1	Zener Diode	HITACHI 3 V
D7	SVC321(A)	V.C. Diode	SANYO
R1	QRD161J-103	CR	10 K 1/6 W
R2	QRD161J-820	CR	82 1/6 W
R3	QRD161J-472	CR	4.7 K 1/6 W
R4	QVPB613-103	VR	10 K N BL STOP
R5	QVPB613-103	VR	10 K BURST STOP
R6	QVPB613-103	VR	10 K BURST START
R7	QRD161J-122	CR	1.2 K 1/6 W
R8	QRD161J-222	CR	2.2 K 1/6 W
R9	QRD161J-681	CR	680 1/6 W
R10	QRD161J-102	CR	1 K 1/6 W
R11	QRD161J-153	CR	15 K (PAL only)
R12	QRD161J-823	CR	82 K (PAL only)
R13	QRD161J-473	CR	47 K 1/6 W
R14	QRD161J-822	CR	8.2 K 1/6 W
R15	QRD161J-681	CR	680 1/6 W
R16	QRD161J-123	CR	12 K 1/6 W
R17	QRD161J-822	CR	8.2 K 1/6 W
R18	QRD161J-681	CR	680 1/6 W
R19	QVPB613-201	VR	200 C BAR Y
R20	QRD161J-331	CR	330 1/6 W
R21	QRD161J-681	CR	680 1/6 W
R22	QRD161J-471	CR	470 1/6 W
R23	QVPB613-501	VR	500 C BAR R-Y
R24	QRD161J-151	CR	150 1/6 W
R25	QRD161J-182	CR	1.8 K 1/6 W
R26	QVPB613-102	VR	1 K C BAR B-Y
R27	QRD161J-152	CR	1.5 K 1/6 W
R28	QRD161J-561	CR	560 1/6 W
R29	QRD161J-272	CR	2.7 K 1/6 W
R30	QRD161J-183	CR	18 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R31	QRD161J-683	CR	68 K 1/6 W
R32	QRD161J-472	CR	4.7 K 1/6 W
R33	QRD161J-102	CR	1 K 1/6 W
R34	QVPB613-204	VR	200 K (NTSC only)
R35	QRD161J-334	CR	330 K (NTSC only)
R36	QRD161J-183	CR	18 K 1/6 W
R37	QRD161J-333	CR	33 K 1/6 W
R38	QRD161J-102	CR	1 K 1/6 W
R39	QRD161J-102	CR	1 K 1/6 W
R40	QRD161J-102	CR	1 K 1/6 W
R41	QRD161J-102	CR	1 K 1/6 W
R42	QRD161J-102	CR	1 K 1/6 W
R43	QRD161J-102	CR	1 K 1/6 W
R44	QRD161J-272	CR	2.7 K 1/6 W
R45	QRD161J-333	CR	33 K 1/6 W
R46	QRD161J-223	CR	22 K 1/6 W
R47	QRD161J-102	CR	1 K 1/6 W
R48	QRD161J-333	CR	33 K 1/6 W
R49	QRD161J-223	CR	22 K 1/6 W
R50	QRD161J-821	CR	820 1/6 W
R51–54	QRD161J-102	CR	1 K (NTSC only)
R55	QRD161J-222	CR	2.2 K (NTSC only)
R56	QRD161J-333	CR	33 K (NTSC only)
R57	QRD161J-223	CR	22 K (NTSC only)
R58	QRD161J-102	CR	1 K (NTSC only)
R59	QRD161J-221	CR	220 1/6 W
R62	QRD161J-273	CR	27 K 1/6 W
R63	QRD161J-103	CR	10 K 1/6 W
R64	QRD161J-392	CR	3.9 K 1/6 W
R65	QRD161J-102	CR	1 K 1/6 W
R66	QRD161J-103	CR	10 (PAL only)
R67	QVDB613-202	VR	2 K (PAL only)
R68	QRD161J-102	CR	1 K 1/6 W
R69	QRD161J-223	CR	22 K 1/6 W
R70	QRD161J-153	CR	15 K 1/6 W
R71	QRD161J-102	CR	1 K 1/6 W
R72	QRD161J-152	CR	1.5 K 1/6 W
R73	QRD161J-392	CR	3.9 K 1/6 W
R74	QRD161J-105	CR	1 M 1/6 W
R75	QRD161J-333	CR	33 K 1/6 W
R76	QRD161J-220	CR	22 1/6 W
R77	QRD161J-220	CR	22 1/6 W
R78	QRD161J-392	CR	3.9 K 1/6 W
R79	QVPB613-102	VR	1 K C BAL B-Y
R80	QRD161J-222	CR	2.2 K 1/6 W
R81	QVPB613-102	VR	1 K C BAL R-Y
R82	QVPB613-102	VR	1 K (PAL only)
R83	QRD161J-100	CR	10 1/6 W
R84	QRD161J-102	CR	1 K (NTSC only)
R85	QRD161J-102	CR	1 K 1/6 W
R86	QRD161J-102	CR	1 K 1/6 W
R87	QRD161J-273	CR	27 K 1/6 W
R88	QRD161J-393	CR	39 K 1/6 W
R89	QRD161J-222	CR	2.2 K 1/6 W
R90	QRD161J-103	CR	10 K (NTSC only)
R91	QVPB613-501	VR	500 (NTSC only)
R92	QRD161J-562	CR	5.6 K (NTSC only)
R93	QRD161J-103	CR	10 K (NTSC only)
R94	QRD161J-562	CR	5.6 K (NTSC only)

Symbol No.	Part No.	Part Name	Description
R95	QRD161J-102	CR	1 K (NTSC only)
R96	QRD161J-821	CR	820 (NTSC only)
R97	QRD161J-221	CR	220 1/6 W
R98	QVPB613-202	VR	2 K Y/C LEVEL
R99	QVPB613-501	VR	500 CHROMA LEVEL
R100	QRD161J-102	CR	1 K 1/6 W
R101	QRD161J-821	CR	820 1/6 W
R102	–	–	
R103	QRD161J-471	CR	470 1/6 W
R104	QRD161J-333	CR	33 K 1/6 W
R105	QRD161J-153	CR	15 K 1/6 W
R106	QRD161J-102	CR	1 K 1/6 W
R107	QRD161J-681	CR	680 1/6 W
R108	QRD161J-221	CR	220 1/6 W
R109	–	–	
R110	QVPB613-202	VR	2 K COMP LEVEL
R111	QRD161J-223	CR	22 K 1/6 W
R112	QRD161J-153	CR	15 K 1/6 W
R113–114	QRD161J-102	CR	1 K 1/6 W
R115	QRD161J-392	CR	3.9 K 1/6 W
R116	QVPB613-102	VR	1 K B-Y GAIN
R117	QRD161J-221	CR	220 1/6 W
R118	QRD161J-152	CR	1.5 K 1/6 W
R119	QVPB613-202	VR	2 K BURST LEVEL
R120	QRD161J-102	CR	1 K 1/6 W
R121	QRD161J-100	CR	10 (NTSC only)
R122	QRD161J-103	CR	10 K 1/6 W
R123	QRD161J-102	CR	1 K 1/6 W
R124	QRD161J-223	CR	22 K 1/6 W
R125	QRD161J-153	CR	15 K 1/6 W
R126	QRD161J-102	CR	1 K 1/6 W
R127	QRD161J-152	CR	1.5 K 1/6 W
R128	QRD161J-392	CR	3.9 K 1/6 W
R129	QRD161J-105	CR	1 M 1/6 W
R130	QRD161J-333	CR	33 K 1/6 W
R131	QRD161J-123	CR	12 K (PAL only)
R132	QRD161J-391	CR	390 (for NTSC)
	QRD161J-121	CR	120 (for PAL)
R133	QVPB613-501	VR	500 QUADRATURE
R134	QRD161J-821	CR	820 1/6 W
R135	QRD161J-273	CR	27 K 1/6 W
R136	QRD161J-273	CR	27 K 1/6 W
R137	QRD161J-103	CR	10 K (NTSC only)
R138	QRD161J-103	CR	10 K (NTSC only)
R139	QRD161J-103	CR	10 K (NTSC only)
R140	QRD161J-102	CR	1 K (NTSC only)
R141	QRD161J-102	CR	1 K (NTSC only)
R142	QRD161J-104	CR	100 K (NTSC only)
R143	QRD161J-222	CR	2.2 K (NTSC only)
R144	QRD161J-682	CR	6.8 K (NTSC only)
R145	QRD161J-104	CR	100 K (NTSC only)
R146	QRD161J-102	CR	1 K (NTSC only)
R147	QRD161J-221	CR	220 (NTSC only)
R148	QVPB613-501	VR	500 (NTSC only)
R149	QRD161J-221	CR	220 (NTSC only)
R150	QRD161J-221	CR	220 1/6 W
R151	QRD161J-182	CR	1.8 K 1/6 W
R152	QRD161J-272	CR	2.7 K 1/6 W
R153	QRD161J-103	CR	10 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R154	QRD161J-473	CR	47 K 1/6 W
R155	QRD161J-105	CR	1 M 1/6 W
R156	QRD161J-123	CR	12 K 1/6 W
R157	QRD161J-221	CR	220 1/6 W
R158	QRD161J-682	CR	6.8 K 1/6 W
R159	QRD161J-103	CR	10 K 1/6 W
R160	QRD161J-103	CR	10 K 1/6 W
R161	QRD161J-332	CR	3.3 K 1/6 W
R162	QVPB613-103	VR	10 K DIF BAL
R163	QRD161J-103	CR	10 K 1/6 W
R164	QRD161J-471	CR	470 1/6 W
R165	QRD161J-222	CR	2.2 K 1/6 W
R166	QRD161J-122	CR	1.2 K 1/6 W
R167	QRD161J-221	CR	220 1/6 W
R168	QRD161J-471	CR	470 1/6 W
R169	QRD161J-104	CR	100 K 1/6 W
R170	QRD161J-103	CR	10 K 1/6 W
R171	QRD161J-332	CR	3.3 K 1/6 W
R172	QVPB613-501	VR	500 B.B GAIN
R173	QRD161J-221	CR	220 1/6 W
R174	QRD161J-222	CR	2.2 K 1/6 W
R177	QRD161J-221	CR	220 (PAL only)
R178	QVPB613-202	VR	2 K B.B 3 LEVEL
R179	QRD161J-221	CR	220 1/6 W
R180	QVPB613-202	VR	2 K B.B 2 LEVEL
R181	QRD161J-221	CR	220 1/6 W
R182	QVPB613-202	VR	2 K B.B 1 LEVEL
R183	QRD161J-102	CR	1 K 1/6 W
R184	QRD161J-561	CR	560 1/6 W
R185	QVPB613-202	VR	2 K Y (Y/C) LEVEL
R186	QRD161J-474	CR	470 K 1/6 W
R187	QRD161J-474	CR	470 K 1/6 W
R188	QRD161J-474	CR	470 K 1/6 W
R189	QRD161J-474	CR	470 K 1/6 W
R190	QRD161J-474	CR	470 K 1/6 W
R191	QRD161J-474	CR	470 K 1/6 W
R192	QRD161J-474	CR	470 K 1/6 W
R193	QVPB613-501	VR	500
R200	QRD161J-183	CR	18 K 1/6 W
R201	QRD161J-683	CR	68 K 1/6 W
R202	QRD161J-472	CR	4.7 K 1/6 W
R203	QVPB613-204	VR	200 K (NTSC only)
R204	QRD161J-334	CR	330 K (NTSC only)
R205	QRD161J-681	CR	680 1/6 W
R206	QRD161J-183	CR	18 K 1/6 W
R207	QRD161J-333	CR	33 K 1/6 W
R208	QRD161J-102	CR	1 K 1/6 W
R209	QRD161J-102	CR	1 K 1/6 W
R210	QRD161J-102	CR	1 K 1/6 W
R211	QRD161J-102	CR	1 K 1/6 W
R212	QRD161J-102	CR	1 K 1/6 W
R213	QRD161J-102	CR	1 K 1/6 W
R214	QRD161J-333	CR	33 K 1/6 W
R215	QRD161J-223	CR	22 K 1/6 W
R216	QRD161J-102	CR	1 K 1/6 W
R217	QRD161J-102	CR	1 K 1/6 W
R218	QRD161J-333	CR	33 K 1/6 W
R219	QRD161J-223	CR	22 K 1/6 W
R220	QRD161J-821	CR	820 1/6 W

Symbol No.	Part No.	Part Name	Description
R221	–	–	
R222	QRD161J-821	CR	820 1/6 W
R223	QRD161J-102	CR	1 K 1/6 W
R224	QVPB613-501	VR	500 PVW C LEVEL
R225–226	QRD161J-102	CR	1 K 1/6 W
R227	QRD161J-333	CR	33 K 1/6 W
R228	QRD161J-223	CR	22 K 1/6 W
R229	QRD161J-221	CR	220 1/6 W
R230	QVPB613-202	VR	2 K PVW LEVEL
R231	QRD161J-273	CR	27 K 1/6 W
R232	QRD161J-103	CR	10 K 1/6 W
R233	QRD161J-392	CR	3.9 K 1/6 W
R234	QVPB613-102	VR	1 K PVW R-Y GAIN
R235	QRD161J-103	CR	10 K (PAL only)
R236	QRD161J-102	CR	1 K 1/6 W
R237	QRD161J-223	CR	22 K 1/6 W
R238	QRD161J-153	CR	15 K 1/6 W
R239	QRD161J-102	CR	1 K 1/6 W
R240	QRD161J-152	CR	1.5 K 1/6 W
R241	QRD161J-392	CR	3.9 K 1/6 W
R242	QRD161J-474	CR	470 K 1/6 W
R243	QRD161J-333	CR	33 K 1/6 W
R244–245	QRD161J-220	CR	22 1/6 W
R246	QRD161J-392	CR	3.9 K 1/6 W
R247	QVPB613-102	VR	1 K PVW B-Y BAL
R248	QRD161J-222	CR	2.2 K 1/6 W
R249	QVPB613-102	VR	1 K PVW R-Y BAL
R250	QVPB613-102	VR	1 K (PAL only)
R251	QRD161J-100	CR	10 1/6 W
R252–253	QRD161J-102	CR	1 K 1/6 W
R254	QRD161J-273	CR	27 K 1/6 W
R255	QRD161J-222	CR	2.2 K 1/6 W
R256	QRD161J-223	CR	22 K 1/6 W
R257	QRD161J-153	CR	15 K 1/6 W
R258–259	QRD161J-102	CR	1 K 1/6 W
R260	QRD161J-392	CR	3.9 K 1/6 W
R261	QVPB613-102	VR	1 K PVW B-Y GAIN
R262	QRD161J-221	CR	220 1/6 W
R263	QVPB613-202	VR	2 K (PAL only)
R264	QRD161J-100	CR	10 (NTSC only)
R265	QRD161J-103	CR	10 K 1/6 W
R266	QRD161J-102	CR	1 K 1/6 W
R267	QVPB613-202	VR	2 K PVW BURST
R268	QRD161J-152	CR	1.5 K 1/6 W
R269	QRD161J-102	CR	1 K 1/6 K
R270	QRD161J-223	CR	22 K 1/6 W
R271	QRD161J-153	CR	15 K 1/6 K
R272	QRD161J-102	CR	1 K 1/6 W
R273	QRD161J-152	CR	1.5 K 1/6 W
R274	QRD161J-392	CR	3.9 K 1/6 W
R275	QRD161J-474	CR	470 K 1/6 W
R276	QRD161J-333	CR	33 K 1/6 W
R277	QRD161J-123	CR	12 K (PAL only)
R278	QRD161J-391 QRD161J-121	CR CR	390 (for NTSC) 120 (for PAL)
R279	QVPB613-501	VR	500 PVW QUADRATURE
R280	QRD161J-821	CR	820 1/6 W
R281–282	QRD161J-273	CR	27 K 1/6 W
R283	QRD161J-393	CR	39 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R284	QRD161J-102	CR	1 K 1/6 W
R285	QRD161J-272	CR	2.7 K 1/6 W
R286	QVPB702-103	VR	10 K H PHASE
R287	QVPB702-202	VR	2 K SC FINE
R288	QRD161J-222	CR	2.2 K (NTSC only)
R289	QRD161J-222	CR	2.2 K (NTSC only)
R290	QRD161J-182	CR	1.8 K (NTSC only)
R291	QRD161J-102	CR	1 K 1/6 W
R292	QRD161J-331	CR	330 1/6 W
R293	QRD161J-331	CR	330 1/6 W
R294	QRD161J-471	CR	470 1/6 W
R295	QRD161J-471	CR	470 1/6 W
R296	QRD161J-471	CR	470 1/6 W
R297	QRD161J-471	CR	470 1/6 W
R298	QRD161J-471	CR	470 1/6 W
R299	QRD161J-471	CR	470 1/6 W
R300	QRD161J-471	CR	470 1/6 W
R301	QVPB613-201	VR	200 (NTSC only)
R302	QRD161J-100	CR	10 1/6 W
R303	QRD161J-100	CR	10 1/6 W
R304	QRD161J-100	CR	10 1/6 W
R305	QRD161J-100	CR	10 1/6 W
R306	QRD161J-390	CR	39 (NTSC only)
R307	QRD161J-561	CR	560 1/6 W
R308	QRD161J-561	CR	560 1/6 W
R309	QRD161J-682	CR	6.8 K 1/6 W
R310	QRD161J-472	CR	4.7 K 1/6 W
R311	QRD161J-473	CR	47 K 1/4 W (NTSC only)
R312	QRD161J-274	CR	270 K 1/6 W (NTSC only)
C1	QCS11HJ-150	C Cap	15 P
C2	QCS11HJ-181	C Cap	180 P
C3	QCS11HJ-101	C Cap	100 P
C4	QER41CM-476	E Cap	47 16 V
C5	QER41CM-476	E Cap	47 16 V
C6	QER41CM-476	E Cap	47 16 V
C7	QER41CM-476	E Cap	47 16 V
C8	QER41CM-476	E Cap	47 16 V
C9	QER41CM-476	E Cap	47 16 V
C10	QEPC0JM-476	NP Cap	47 6.3 V
C11	QER41CM-476	E Cap	47 16 V
C12	QER41CM-476	E Cap	47 16V (NTSC only)
C13	QER41CM-476	E Cap	47 16 V
C14	QER41CM-476	E Cap	47 16 V
C15	–	–	
C16	QER41CM-476	E Cap	47 16 V
C17	QER41CM-476	E Cap	47 16 V
C18	QER41CM-476	E Cap	47 16 V
C19	QER41CM-476	E Cap	47 16 V
C20	QER41CM-476	E Cap	47 16 V
C21	QCS11HJ-121	C Cap	120 P
C22	QCS11HJ-560	C Cap	56 P
C23	QEJ41VM-684	T Cap	0.68 35 V
C24	QER41CM-476	E Cap	47 16 V
C25–26	QCZ0206-104	C Cap	0.1
C28	QCZ0206-104	C Cap	0.1 (NTSC only)
C29	QCZ0206-104	C Cap	0.1
C30	QCS11HJ-560 QCS11HJ-390	C Cap C Cap	56 P (for NTSC) 39 P (for PAL)

Symbol No.	Part No.	Part Name	Description
C31	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-330	C Cap	33 P (for PAL)
C32	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-180	C Cap	18 P (for PAL)
C33	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)
C34	QEPC1HM-105	NP Cap	1 50 V
C35	QER41HM-475	E Cap	4.7 50 V
C36	QER41CM-476	E Cap	47 16 V
C37	QCZ0206-104	C Cap	0.1 (NTSC only)
C38	QCZ0206-104	C Cap	0.1 (NTSC only)
C39	QCS11HJ-220	C Cap	22 P (NTSC only)
C40	QCS11HJ-5R0	C Cap	5 P (NTSC only)
C41	QCS11HJ-470	C Cap	47 P (NTSC only)
C42	QCS11HJ-390	C Cap	39 P (NTSC only)
C43	QCS11HJ-220	C Cap	22 P (NTSC only)
C44	QER41CM-476	E Cap	47 16 V
C45	QER41CM-475	E Cap	4.7 50 V
C46	QER41CM-476	E Cap	47 16 V
C47	QER41CM-476	E Cap	47 16 V
C48	QER41CM-476	E Cap	47 16 V
C49	–	–	
C50	QER41CM-476	E Cap	47 16 V
C51	QER41CM-476	E Cap	47 16 V
C52	QER41CM-476	E Cap	47 16 V
C53	QER41CM-476	E Cap	47 16 V
C54	QER41CM-476	E Cap	47 16 V
C55	QCS11HJ-121	C Cap	120 P
C56	QCS11HJ-560	C Cap	56 P
C57	QEJ41VM-684	T Cap	0.68 35 V
C58	QCZ0206-104	C Cap	0.1
C59	QCZ0206-104	C Cap	0.1
C60	QCZ0206-104	C Cap	0.1
C61	QCZ0206-104	C Cap	0.1
C62	QCZ0206-104	C Cap	0.1 (PAL only)
C63	QCZ0206-104	C Cap	0.1 (PAL only)
C64	QCZ0206-104	C Cap	0.1 (NTSC only)
C65	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)
C66	QCZ0206-104	C Cap	0.1
C67	QCZ0206-104	C Cap	0.1 (NTSC only)
C68	QCZ0206-104	C Cap	0.1 (NTSC only)
C69	QCZ0206-104	C Cap	0.1 (NTSC only)
C70	QCZ0206-104	C Cap	0.1 (NTSC only)
C71	QCZ0206-104	C Cap	0.1 (NTSC only)
C72	QCR41CM-476	E Cap	47 16V (NTSC only)
C73	QCZ0206-104	C Cap	0.1 (NTSC only)
C74	QCS11HJ-560	C Cap	56 P (NTSC only)
C75	QAT3001-010	TR Cap	4.27 LOCK (NTSC only)
C76	QCZ0206-104	C Cap	0.1 (NTSC only)
C77	QER41EM-106	E Cap	10 25 V
C78	QEPC1HM-105	NP Cap	1 16 V
C79	QCS11HJ-150	C Cap	15 P
C80	QER41CM-476	E Cap	47 16 V
C81	QCZ0206-104	C Cap	0.1
C82	–	–	
C83–85	QER41CM-476	E Cap	47 16 V
C86	QCS11HJ-180	C Cap	18 P
C88–92	QER41CM-476	E Cap	47 16 V

Symbol No.	Part No.	Part Name	Description
C93–97	QER41CM-476	E Cap	47 16 V
C100	QER41CM-476	E Cap	47 16 V
C101	QER41CM-476	E Cap	47 16 V
C102	QER41CM-476	E Cap	47 16 V
C103	QER41CM-476	E Cap	47 16 V
C104	QEPC0JM-476	NP Cap	47 6.3 V
C105	QER41CM-476	E Cap	47 16 V
C106	QER41CM-476	E Cap	47 16 V
C107	QER41CM-476	E Cap	47 16 V
C108	QER41CM-476	E Cap	47 16 V
C109	QER41CM-476	E Cap	47 16 V
C110	QCS11HJ-121	C Cap	120 P
C111	QCS11HJ-560	C Cap	56 P
C112	QEJ41VM-684	T Cap	0.68 35 V
C113	QER41CM-476	E Cap	47 16 V
C114	QCZ0206-104	C Cap	0.1
C115	QCZ0206-104	C Cap	0.1
C116	QCZ0206-104	C Cap	0.1
C117	QCZ0206-104	C Cap	0.1 (PAL only)
C118	QCZ0206-104	C Cap	0.1 (NTSC only)
C119	QCS11HJ-560	C Cap	56 P (for NTSC)
	QCS11HJ-390	C Cap	39 P (for PAL)
C120	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-330	C Cap	33 P (for PAL)
C121	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-180	C Cap	18 P (for PAL)
C122	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)
C123	QEPC1HM-105	NP Cap	1 50 V
C124	QER41CM-476	E Cap	47 16 V
C125	QER41CM-476	E Cap	47 16 V
C126	QER41CM-476	E Cap	47 16 V
C127	QER41CM-476	E Cap	47 16 V
C128	QCS11HJ-121	C Cap	120 P
C129	QCS11HJ-560	C Cap	56 P
C130	QEJ41VM-684	T Cap	0.68 35 V
C131	QCZ0206-104	C Cap	0.1
C132	QCZ0206-104	C Cap	0.1
C133	QCZ0206-104	C Cap	0.1
C134	QCZ0206-104	C Cap	0.1
C136	QCZ0206-104	C Cap	0.1 (PAL only)
C137	QCZ0206-104	C Cap	0.1 (NTSC only)
C138	QCT25UJ-151	C Cap	150 P (for NTSC)
	QCV25UJ-121	C Cap	120 P (for PAL)
C139	QER41CM-476	E Cap	47 16 V
C140	QER41HM-475	E Cap	4.7 50 V
C141	QCZ0206-104	C Cap	0.1
C142	QCS11HJ-330	C Cap	33 P (NTSC only)
C143	QCS11HJ-180	C Cap	18 P (NTSC only)
C144	QCS11HJ-270	C Cap	27 P (NTSC only)
C145	QER41CM-476	E Cap	47 16 V
C146	QCZ0206-104	C Cap	0.1
C147	QCZ0206-104	C Cap	0.1
C148	QCZ0206-104	C Cap	0.1
C149	QCZ0206-104	C Cap	0.1
C150	QER41CM-476	E Cap	47 16 V
C151	QER41CM-476	E Cap	47 16V (NTSC only)
C152	QCS11HJ-270	C Cap	27 P
C153	QCS11HJ-270	C Cap	27 P
C154	QCS11HJ-121	C Cap	120 P

Symbol No.	Part No.	Part Name	Description
L2	SCV0331-100	Peaking Coil	10 μ
L3	SCV0331-220	Peaking Coil	22 μ
L4	SCV0331-680	Peaking Coil	68 μ (NTSC only)
L5	SCV0331-680	Peaking Coil	68 μ (NTSC only)
L6	SCV0331-220	Peaking Coil	22 μ
L7	SCV0331-820	Peaking Coil	82 μ
L8	SCV0331-120	Peaking Coil	12 μ
L9	SCV0331-100	Peaking Coil	10 μ
L10	SCV0331-220	Peaking Coil	22 μ
L11	SCV0331-220	Peaking Coil	22 μ
L12	SCV0331-120	Peaking Coil	12 μ
DL1	SCV0639-001	Delay Line	
DL2	SCV1567-001	Delay Line	120 nsec (NTSC only)
DL3	SCV0639-001	Delay Line	
LC1	EXC-EMT271BT	EMI Filter	
X1	SSV0597	CRYSTAL	4.27 MHz (NTSC only)
CK1	SFE4.27MB	Filter	4.27 MHz (NTSC only)
SW1	SCV1549-001	Toggle Switch	EXT SC COARSE
CN2	SCV1468-020	Socket	20 Pin
CBM1 – 7	**CBMC4355-00A**	**VIDEO CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SC2814(F4.5)	Transistor	SANYO
Q3	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V

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Symbol No.	Part No.	Part Name	Description
IC1	SCV0322-002	IC (M)	JVC
IC2	–	–	
IC3	SCV0486-001	Function Module (H)	JVC
IC4	HA11244	IC (M)	HITACHI
IC5	UPD74HC00C	IC	NEC
IC6	TC40H004P	IC (M)	TOSHIBA
IC7	TC40H000P	IC (M)	TOSHIBA
IC8	TC40H000P	IC (M)	TOSHIBA
IC9	TC4528BP	IC (M)	TOSHIBA
IC10	TC4053BF	IC (M)	TOSHIBA
IC11	–	–	
IC12	TL082CP	IC (M)	TEXAS
IC13	SCV0757-001	Function Module (H)	JVC
IC14	SCV0758-001	Function Module (H)	JVC
IC15	SCV0759-001	Function Module (H)	JVC
IC16	SCV0471-002	Function Module (H)	JVC
IC17	SCV0471-012	Function Module (H)	JVC
Q1	2SC2295(B)	Transistor	MATSUSHITA
Q2	2SC2295(B)	Transistor	MATSUSHITA
Q3	2SC2295(B)	Transistor	MATSUSHITA
Q4	2SC2295(B)	Transistor	MATSUSHITA
Q5	2SC2295(B)	Transistor	MATSUSHITA
Q6	2SC2295(B)	Transistor	MATSUSHITA
Q7	2SC2295(B)	Transistor	MATSUSHITA
Q8	2SA1022(B)	Transistor	MATSUSHITA
Q9	2SC2295(B)	Transistor	MATSUSHITA
Q10	2SC2295(B)	Transistor	MATSUSHITA
Q11	2SK198(Q)	Transistor	MATSUSHITA
Q12	2SA1022(B)	Transistor	MATSUSHITA
Q13	2SC2295(B)	Transistor	MATSUSHITA
Q14	2SA1022(B)	Transistor	MATSUSHITA
Q15	2SA1022(B)	Transistor	MATSUSHITA
Q16	2SA1022(B)	Transistor	MATSUSHITA
Q17	2SC2295(B)	Transistor	MATSUSHITA
Q18	2SC2295(B)	Transistor	MATSUSHITA
Q19	2SC2295(B)	Transistor	MATSUSHITA
Q20	2SC2295(B)	Transistor	MATSUSHITA
Q21	2SA1022(B)	Transistor	MATSUSHITA
Q22	2SA1022(B)	Transistor	MATSUSHITA
Q23	2SC2295(B)	Transistor	MATSUSHITA
Q24	2SC2295(B)	Transistor	MATSUSHITA
Q25	2SC2295(B)	Transistor	MATSUSHITA
D1	MA152A	Diode	MATSUSHITA
D2	–	–	
D3	–	–	
D4	SCV321(A)	V.C. Diode	SANYO
D5	–	–	
D6	SCV321(A)	V.C. Diode	SANYO

Symbol No.	Part No.	Part Name	Description
R22	QVPB613-202	VR	2 K INT SC FINE
R135	QVPB613-104	VR	100 K SC OFFSET
C1	NCB21HK-103	C Cap	0.01 50 V
C2	–	–	
C3	NCB21HK-103	C Cap	0.01 50 V
C4	NCT03CH-101	C Cap	100 P 50 V
C5	NCT03CH-101	C Cap	100 P 16 V
C6	NCT03CH-560	C Cap	56 P 16 V
C7	NCB21HK-103	C Cap	0.01 50 V
C8	NCT03CH-101	C Cap	100 P 50 V
C9	QEJ41AM-106	T Cap	10 10 V
C10	NCT03CH-560	C Cap	56 P 16 V
C11	NCB21HK-103	C Cap	0.01 50 V
C12	NCF21EZ-104	C Cap	0.1 50 V
C13	NCB21HK-103	C Cap	0.01 50 V
C14	NCF21EZ-104	C Cap	0.1 50 V
C15	–	–	
C16	–	–	
C17	NCT03CH-390	C Cap	39 P 16 V
C18	–	–	
C19	QEJ41AM-476	T Cap	47 16 V
C20	NCT03CH-151	C Cap	150 P 16 V
C21	QEJ41AM-106	T Cap	10 10 V
C22	QEJ41CM-106	T Cap	10 16 V
C23	NCF21EZ-104	C Cap	0.01 50 V
C24	NCS21HJ-270	C Cap	27 P 50 V
C25	QEJ41VM-224	T Cap	0.022 35 V
C26	QEJ41AM-476	T Cap	47 10 V
C27	QEJ41CM-106	T Cap	10 16 V
C28	QEJ41AM-475	T Cap	4.7 10 V
C29	QER41HM-475	E Cap	4.7 50 V
C30	QER41HM-475	E Cap	4.7 50 V
C31	QER41HM-105	E Cap	1 50 V
C32	–	–	
C33	QEJ41AM-106	T Cap	10 10 V
C34	NCB21HK-272	C Cap	0.0027 50 V
C35	NCS21HK-561	C Cap	560 P 50 V
C36	NCF21EZ-104	C Cap	0.1 50 V
C37	QER41HM-105	E Cap	1 50 V
C38	–	–	
C39	NCF21EZ-104	E Cap	0.1 50 V
C40	NCT03CH-470	C Cap	47 P 16 V
C41	NCF21EZ-104	C Cap	0.1 50 V
C42	–	–	
C43	NCS21HJ-221	C Cap	220 P 50 V
C44	NCB21HK-333	C Cap	0.033 50 V
C45	NCF21EZ-104	C Cap	0.1 50 V
C46	NCF21EZ-104	C Cap	0.1 50 V
C47	NCF21EZ-104	C Cap	0.1 50 V
C48	NCF21EZ-104	C Cap	0.1 50 V
C49	QEJ41VM-105	T Cap	1 35 V
C50	NCB21HK-333	C Cap	0.033 50 V
C51	QEJ41VM-105	T Cap	1 35 V
C52	QEJ41VM-106	T Cap	10 10 V

Symbol No.	Part No.	Part Name	Description
C53	QAT3001-011	TR Cap	18 P H. LOCK
C54	NCS21HJ-3R0	C Cap	3 P 50 V
C55	QCT05UJ-390	C Cap	39 P
C56	NCB21HK-103	C Cap	0.01 50 V
C57	NCF21EZ-104	C Cap	0.1 50 V
C58	–	–	
C59	–	–	
C60	–	–	
C61	–	–	
C62	–	–	
C63	QER41EM-106	E Cap	10 16 V
C64	QER41CM-476	E Cap	47 16 V
C65	QER41HM-105	E Cap	1 50 V
C66	QETA1AM-477	E Cap	470 10 V
C67	–	–	
C68	QER41CM-476	E Cap	47 16 V
C69	QER41CM-476	E Cap	47 16 V
C70	–	–	
C71	QEJ41AM-106	T Cap	10 10 V
C72	–	–	
C73	QER61EM-106	E Cap	10 25 V
L1	SCV0331-820	Peaking Coil	82 μH
L2	SCV0331-120	Peaking Coil	12 μH
L3	SCV0331-220	Peaking Coil	22 μH
L4	–	–	
L5	SCV0331-101	Peaking Coil	100 μH
LC1	DST306-92B102M	LC. Filter	
X'tal 1	SCV0351-001	CRYSTAL	TCXO (14.31818 MHz)
X'tal 2	SCV0351-002	CRYSTAL	
T1	GC44286-001	Trans	SC FREQ.
CN1	SCV0343-001	Connector	
CN2	SCV1227-002	Connector	4 Pin
CN9	SCV0343-001	Connector	40 Pin
	SC41023-001	Sheet	
	SCV1227-005	Connector	5 Pin
	SS30644-006	Connector	6 Pin

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Symbol No.	Part No.	Part Name	Description
IC1	AN90B22	IC	MATSUSHITA
IC2	TC74HC373P	IC	TOSHIBA
IC3	AN90B22	IC	MATSUSHITA
IC4	TC74HC373P	IC	TOSHIBA
IC5	AN90B22	IC	MATSUSHITA
IC6	TC74HC373P	IC	TOSHIBA
IC7	AN90B22	IC	MATSUSHITA
IC8	TC74HC373P	IC	TOSHIBA
IC9	AN90B22	IC	MATSUSHITA
IC10	AN90B22	IC	MATSUSHITA
IC11	TC74HC373P	IC	TOSHIBA
IC12	AN90B22	IC	TOSHIBA
IC13	TC74HC373P	IC	MATSUSHITA
IC14	LR74HC245	IC	SHARP
IC15	LR74HC245	IC	SHARP
IC16	LR74HC245	IC	SHARP
IC17	LR74HC245	IC	SHARP
IC18	LR74HC245	IC	SHARP
IC19	UPD71055C	IC	NEC (I/O PORT)
IC20	UPD71055C	IC	NEC (I/O PORT)
IC21	UPD71055C	IC	NEC (I/O PORT)
IC22	UPD71055C	IC	NEC (I/O PORT)
IC23	TC40H004P	IC	TOSHIBA
IC24	UPD74HC393C	IC	NEC
IC25	LR74HC245	IC	SHARP
IC26	LR74HC245	IC	SHARP
IC27	LR74HC245	IC	SHARP
IC28	LR74HC138	IC	SHARP
IC29	LR74HC138	IC	SHARP
IC30	TC74HC08P	IC	TOSHIBA
IC31	LR74HC32	IC	SHARP
IC32	TC40H004P	IC	TOSHIBA
IC33	PLSC1006-V1-00	IC	Parts are supplied in Packs of 3 (or 2 according to ROM version) units.
IC34	PLSC1006-V1-00	IC	
IC35	PLSC1006-V1-00	IC	
IC36	TC5564APL-15	IC	TOSHIBA (8 K RAM)
IC37	TC5564APL-15	IC	TOSHIBA (8 K RAM)
IC38	UPD74HC00C	IC	NEC
IC39	TC74HC20P	IC	TOSHIBA
IC40	LH0080A	IC	SHARP (CPU)
IC41	LH0082A	IC	SHARP (CTC)
IC42	BU18440B	IC	ROHM (SIO)
IC43	LH0081A	IC	SHARP (PIO)
Q1	2SC1570NP(F)	Transistor	SANYO
Q2	2SC1570NP(F)	Transistor	SANYO
Q3	2SC1570NP(F)	Transistor	SANYO
Q4	2SC1570NP(F)	Transistor	SANYO
Q5	2SA929(F)	Transistor	SANYO
Q6	2SC1570NP(F)	Transistor	SANYO
Q7	2SC1570NP(F)	Transistor	SANYO
D1	MA165	Diode	MATSUSHITA
D2	GZA3.3(Y)	Zener Diode	SANYO
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
R1	QRD161J-103	CR	10 K 1/6 W
R2	QRD161J-103	CR	10 K 1/6 W
R3	QRD161J-101	CR	100 1/6 W
R4	QRD161J-102	CR	1 K 1/6 W
R5	QRD161J-105	CR	1 M 1/6 W
R6	QRD161J-102	CR	1 K 1/6 W
R7	QRD161J-105	CR	1 M 1/6 W
R9	QRD161J-101	CR	100 1/6 W
R10	QRD161J-102	CR	1 K 1/6 W
R11	QRD161J-102	CR	1 K 1/6 W
R12	QRD161J-102	CR	1 K 1/6 W
R13	QRD161J-102	CR	1 K 1/6 W
R14	QRD161J-102	CR	1 K 1/6 W
R15	QRD161J-102	CR	1 K 1/6 W
R16	QRD161J-102	CR	1 K 1/6 W
R17	QRD161J-102	CR	1 K 1/6 W
R18	QRD161J-101	CR	100 1/6 W
R20	QRD161J-103	CR	10 K 1/6 W
R21	QRD161J-471	CR	470 1/6 W
R22	QRD161J-472	CR	4.7 K 1/6 W
R23	QRD161J-222	CR	2.2 1/6 W
R24	QRD161J-223	CR	22 K 1/6 W
R25	QRD161J-472	CR	4.7 K 1/6 W
R26	QRD161J-473	CR	4.7 1/6 W
R27	QRD161J-101	CR	100 1/6 W
R28	QRD161J-103	CR	10 K 1/6 W
R29	QRD161J-103	CR	10 K 1/6 W
R30	QRD161J-332	CR	3.3 K 1/6 W
R31	QRD161J-103	CR	10 K 1/6 W
R32	QRD161J-332	CR	3.3 K 1/6 W
R33	QRD161J-103	CR	10 K 1/6 W
R34	QRD161J-102	CR	1 K 1/6 W
R35	QRD161J-103	CR	10 K 1/6 W
R36	QRD161J-103	CR	10 K 1/6 W
R37	QRD161J-103	CR	10 K 1/6 W
R38	QRD161J-103	CR	10 K 1/6 W
R39	QRD161J-103	CR	10 K 1/6 W
R40	QRD161J-103	CR	10 K 1/6 W
R41	QRD161J-103	CR	10 K 1/6 W
R42	QRD161J-103	CR	10 K 1/6 W
R43	QRD161J-103	CR	10 K 1/6 W
R44	QRD161J-103	CR	10 K 1/6 W
R45	QRD161J-103	CR	10 K 1/6 W
R46	QRD161J-103	CR	10 K 1/6 W
R47	QRD161J-103	CR	10 K 1/6 W
R48	QRD161J-103	CR	10 K 1/6 W
R49	QRD161J-103	CR	10 K 1/6 W
R50	QRD161J-103	CR	10 K 1/6 W
R51	QRD161J-103	CR	10 K 1/6 W
R52	QRD161J-223	CR	22 K 1/6 W
R53	QRD161J-222	CR	2.2 K 1/6 W
R54	QRD161J-103	CR	10 K 1/6 W
C1	QCZ0206-104	C Cap	0.1
C2	QCZ0206-104	C Cap	0.1
C3	QCZ0206-104	C Cap	0.1

7.13-P SG board assembly (PAL version) 1 3

1 3 ☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC1	SCV0322-002	IC	JVC
IC2	UPD74HC04C	IC	NEC
IC3	SCV0486-001	IC	JVC
IC4	HA11244	IC	HITACHI
IC5	TC40H002P	IC	TOSHIBA
IC6	TC40H000P	IC	TOSHIBA
IC7	TC40H000P	IC	TOSHIBA
IC8	UPD74HC00C	IC	NEC
IC9	TC4528BP	IC	TOSHIBA
IC10	TC4053BFTP2	IC	TOSHIBA
IC11	SN74LS93N	IC	MOTOROLA
IC12	TL082CP	IC	TEXAS
IC13	SCV0757-001	IC	JVC
IC14	SCV0758-001	IC	JVC
IC15	SCV0759-001	IC	JVC
IC16	SCV0471-002	IC	JVC
IC17	SCV0471-012	IC	JVC
IC18	SCV0532-001	IC	JVC
IC19	AN614	IC	MATSUSHITA
IC20	AN614	IC	MATSUSHITA
IC21	SCV0933-001	IC	JVC
Q1	2SC2295(B.C)	Transistor	
Q2	2SC2295(B.C)	Transistor	
Q3	2SC2295(B.C)	Transistor	
Q4	2SC2295(B.C)	Transistor	
Q5	2SC2295(B.C)	Transistor	
Q6	2SC2295(B.C)	Transistor	
Q7	2SC2295(B.C)	Transistor	
Q8	2SA1022(B.C)	Transistor	
Q9	2SC2295(B.C)	Transistor	
Q10	2SA1022(B.C)	Transistor	
Q11	2SA1022(B.C)	Transistor	
Q12	DTC124K	Digital Transistor	
Q13	2SA1022(B.C)	Transistor	
Q14	2SC2295(B.C)	Transistor	
Q15	2SC2295(B.C)	Transistor	
Q16	2SC2295(B.C)	Transistor	
Q17	2SC2295(B.C)	Transistor	
Q18	2SC2295(B.C)	Transistor	
Q19	2SC2295(B.C)	Transistor	
Q20	2SC2295(B.C)	Transistor	
Q21	2SC2295(B.C)	Transistor	
Q22	2SC2295(B.C)	Transistor	
Q23	2SJ84(Q.R)	FET	
Q24	2SK198(Q.R)	FET	
Q25	2SC2295(B.C)	Transistor	
Q26	2SA1022(B.C)	Transistor	
Q27	2SC2295(B.C)	Transistor	
Q28	2SA1022(B.C)	Transistor	
Q29	DTC124K	Digital Transistor	
Q30	2SA1022(B.C)	Transistor	

Symbol No.	Part No.	Part Name	Description
D1	SVC321(A)	V.C. Diode	
D2	MA152A	Diode	
D3	SVC321(A)	V.C. Diode	
D6	SVC321(A)	V.C. Diode	
D9	MA152A	Diode	
D10	MA152A	Diode	
R37	QVPB613-104	VR	SC OFFSET
C1	NCB21HK-103	C Cap	0.01
C2	NCS21HJ-220	C Cap	22 P
C3	NCB21HK-103	C Cap	0.01
C4	NCT03CH-101	C Cap	100 P
C5	NCT03CH-101	C Cap	100 P
C6	NCT03CH-560	C Cap	56 P
C8	NCB21HK-103	C Cap	0.01
C9	NCF21EZ-104	C Cap	0.1
C10	NCB21HK-103	C Cap	0.01
C11	QEJ41CM-106	T Cap	10 16 V
C12	NCS21HJ-151	C Cap	150 P
C13	QEJ41AM-106	T Cap	10 10 V
C14	QEJ41CM-106	T Cap	10 16 V
C15	NCB21HK-103	C Cap	0.01
C16	QEJ41AM-106	T Cap	10 10 V
C17	NCT03CH-101	C Cap	100 P
C18	NCB21HK-103	C Cap	0.01
C19	QEJ41CM-106	T Cap	10 16 V
C20	NCT03CH-390	C Cap	39 P
C21	NCB21HK-333	C Cap	0.033
C22	NCF21EZ-104	C Cap	0.1
C23	QEJ41AM-476	T Cap	47 10 V
C25	QEJ41VM-105	T Cap	1 35 V
C26	QEJ41AM-106	T Cap	10 10 V
C27	QEJ41VM-105	T Cap	1 35 V
C28	QEJ41VM-105	T Cap	1 35 V
C29	QEJ41AM-476	T Cap	47 10 V
C30	QER41HM-475	E Cap	4.7 50 V
C31	QER41HM-105	E Cap	1 50 V
C32	QER41HM-475	E Cap	4.7 50 V
C33	QEJ41AM-106	T Cap	10 10 V
C34	NCB21HK-272	C Cap	2700 P
C35	NCS21HJ-561	C Cap	560 P
C36	NCF21EZ-104	C Cap	0.1
C37	QER41HM-105	E Cap	1 50 V
C38	NCS21HJ-221	C Cap	220 P
C39	QEJ41AM-106	T Cap	10 10 V
C40	NCF21EZ-104	C Cap	0.1
C41	NCF21EZ-104	C Cap	0.1
C42	NCF21EZ-104	C Cap	0.1
C43	NCF21EZ-104	C Cap	0.1
C44	NCS21HJ-470	C Cap	47 P
C45	NCS21HJ-470	C Cap	47 P
C46	QER41EM-106	E Cap	10 25 V

Symbol No.	Part No.	Part Name	Description
C47	NCF21EZ-104	C Cap	0.1
C48	NCF21EZ-104	C Cap	0.1
C49	NCT03CH-470	C Cap	47 P
C50	QAT3001-011	TR Cap	20 P SC LOCK
C51	NCF21EZ-104	C Cap	0.1
C52	NCF21EZ-104	C Cap	0.1
C54	QEJ41AM-106	T Cap	10 10 V
C56	QER41AM-476	E Cap	47 10 V
C57	QER41EM-106	E Cap	10 25 V
C58	QAT3001-011	TR Cap	20 P H LOCK
C59	NCB21HK-103	C Cap	0.01
C60	NCT03CH-101	C Cap	100 P
C61	QETC1AM-227	C Cap	220 10 V
C62	QER41EM-106	E Cap	10 25 V
C63	QER41CM-476	E Cap	47 16 V
C64	QEJ41CM-476	T Cap	47 16 V
C65	NCS21HJ-330	C Cap	33 P
C66	NCB21HK-103	C Cap	0.01
C67	NCF21EZ-104	C Cap	0.1
C68	QER41HM-476	E Cap	47 10 V
C69	QER41AM-476	E Cap	47 10 V
C70	NCB21HK-103	C Cap	0.01
C71	QEJ41AM-106	C Cap	10 10 V
C72	NCB21HK-103	C Cap	0.01
C73	NCB21HK-103	C Cap	0.01
C74	NCF21EZ-104	C Cap	0.1
C75	QEJ41CM-106	T Cap	10 16 V
C77	NCT03CH-101	C Cap	
C78	NCF21EZ-104	C Cap	
C79	NCT03CH-560	C Cap	
C81	NCB21HK-103	C Cap	
C82	QEX41AM-156	E Cap	
C83	NCT03CH-150	C Cap	
L1	SCV0331-820	Peaking Coil	
L2	SCV0331-120	Peaking Coil	
L3	SCV0331-220	Peaking Coil	
L5	SCV0331-101	Peaking Coil	
L6	SCV0331-470	Peaking Coil	
LC1	EXC-EMT102BT	EMI Filter	
T1	SCV0171-001	Trans	
T2	SCV0171-001	Trans	
X1	SCV0352-001	CRYSTAL	
X2	SCV0348-002	CRYSTAL	
X3	SCV0349-002	CRYSTAL	
CN1	SCV0343-001	Connector	
CN36	SCV1227-002	Connector	

Symbol No.	Part No.	Part Name	Description
C4	QCZ0206-104	C Cap	0.1
C5	QCZ0206-104	C Cap	0.1
C6	QCZ0206-104	C Cap	0.1
C7	QCZ0206-104	C Cap	0.1
C8	QCZ0206-104	C Cap	0.1
C9	QCZ0206-104	C Cap	0.1
C10	QCZ0206-104	C Cap	0.1
C10	QCZ0206-104	C Cap	0.1
C12	QCZ0206-104	C Cap	0.1
C13	QCZ0206-104	C Cap	0.1
C14	QCZ0206-104	C Cap	0.1
C15	QCZ0206-104	C Cap	0.1
C16	QCZ0206-104	C Cap	0.1
C17	QCZ0206-104	C Cap	0.1
C18	QCZ0206-104	C Cap	0.1
C19	QCZ0206-104	C Cap	0.1
C20	QCS11HJ-221	C Cap	220 P
C21	QCS11HJ-221	C Cap	220 P
C22	QCZ0206-104	C Cap	0.1
C23	QCS11HJ-221	C Cap	220 P
C24	QCZ0206-104	C Cap	0.1
C25	QCZ0206-104	C Cap	0.1
C26	QCS11HJ-221	C Cap	220 P
C27	QCS11HJ-100	C Cap	10 P
C28	QCS11HJ-220	C Cap	22 P
C29	QCZ0206-104	C Cap	0.1
C30	QCS11HJ-100	C Cap	10 P
C31	QCS11HJ-220	C Cap	22 P
C32	QCZ0206-104	C Cap	0.1
C33	QCZ0206-104	C Cap	0.1
C34	QCZ0206-104	C Cap	0.1
C35	QCZ0206-104	C Cap	0.1
C36	QCZ0206-104	C Cap	0.1
C37	QCZ0206-104	C Cap	0.1
C38	QCZ0206-104	C Cap	0.1
C39	QCZ0206-104	C Cap	0.1
C40	QCZ0206-104	C Cap	0.1
C41	–	–	
C42	–	–	
C43	–	–	
C44	–	–	
C45	–	–	
C46	–	–	
C47	–	–	
C48	–	–	
C49	–	–	
C50	QCZ0206-104	C Cap	0.1
C51	QCZ0206-104	C Cap	0.1
C52	QCZ0206-104	C Cap	0.1
C53	QCZ0206-104	C Cap	0.1
C54	QCZ0206-104	C Cap	0.1
C55	QCS11HJ-221	C Cap	220 P
C56	QCZ0206-104	C Cap	0.1
C57	QCZ0206-104	C Cap	0.1
C58	QCZ0206-104	C Cap	0.1
C59	QCZ0206-104	C Cap	0.1
C60	QCZ0206-104	C Cap	0.1
C61	QCZ0206-104	C Cap	0.1
C62	QCZ0206-104	C Cap	0.1

Symbol No.	Part No.	Part Name	Description
C63	QETC1HM-105	E Cap	1 V
C70	QETB0JM-108	E Cap	1000 6.3 V
⚠ LC1~93	EXC-EMT271BT	EMI Filter	
RA1	QRB081J-103	Resistor Network	10 K x 8
RA2	QRB081J-103	Resistor Network	10 K x 8
X1	SSV0387	CRYSTAL	4.9 MHz
X2	SCV1398	CRYSTAL	8 MHz
S2	SCV1438-001	Push Switch	Hard Reset
S3	SCV1131-001	Dip Switch	
S4	SCV1131-001	Dip Switch	
Z1	SSV0865	Battery	Memory Backup
J1	SCV1149-001	Socket	
J1	SCV1148-008	Short Pin	
CN6	SCV1197-090	Connector	90 Pin
CN8	SCV1197-032	Connector	32 Pin

7.15 PS board assembly 1 5

1 5 ☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
IC1	M5230L	IC	MATSUSHITA
IC2	NJM78M12A	IC	JRC
IC3	NJM79M12FA	IC	JRC
IC4	SI-3052V	IC	SANKEN
Q1	2SC1384(R)	Transistor	MATSUSHITA
Q2	2SA684(R)	Transistor	MATSUSHITA
Q5	2SC1384(R)	Transistor	MATSUSHITA
Q6	2SA684(R)	Transistor	MATSUSHITA
D1	FMB26L	Diode	SANKEN
D2	FMM22R	Diode	SANKEN
D3	FMM22S	Diode	SANKEN
D4	FMM22R	Diode	SANKEN
D5	DS135TE	Diode	SANYO
R1	QRD161J-271	CR	270 1/6 W
R2	QRD161J-271	CR	270 1/6 W
R3	QRG029J-121	OMR	120 2 W
R4	QRG029J-121	OMR	120 2 W
R5	QRD161J-100	CR	10 1/6 W
R6	QRD161J-182	CR	1.8 K 1/6 W
R7	QRD161J-182	CR	1.8 K 1/6 W
R8	QRD161J-100	CR	10 1/6 W
R9	QRM054K-R22	OMR	0.22 5 W
R10	QRM054K-R22	OMR	0.22 5 W
R11	QRD161J-103	CR	10 K 1/6 W
R12	QVPB613-102	VR	1 K
R13	QRD161J-222	CR	2.2 K 1/6 W
R14	QRD161J-153	CR	15 K 1/6 W
R15	QRD161J-153	CR	15 K 1/6 W
R16	QRD161J-561	CR	560 1/6 W
R17	QRD161J-561	CR	560 1/6 W
C1	QEV71ER-478	E Cap	4700 25 V
C2	QEV71ER-478	E Cap	4700 25 V
C3	QCZ0206-104	C Cap	0.1
C4	QCZ0206-104	C Cap	0.1
C5	QETC1EM-107	E Cap	100 25 V
C6	QETC1EM-107	E Cap	100 25 V
C7	QETC1EM-107	E Cap	100 25 V
C8	QETC1EM-107	E Cap	100 25 V
C9	QCS11HJ-101	C Cap	100 P
C10	QCS11HJ-101	C Cap	100 P
C11	QETC1EM-107	E Cap	100 25 V
C12	QETA1CM-108	E Cap	1000 16 V
C13	QETA1CM-108	E Cap	1000 16 V

Symbol No.	Part No.	Part Name	Description
C14	QCZ0206-104	C Cap	0.1
C15	QCZ0206-104	C Cap	0.1
C16	QETB1EM-477	E Cap	470 25 V
C17	QETB1EM-477	E Cap	470 25 V
C18	QCZ0206-104	C Cap	0.1
C19	QCZ0206-104	C Cap	0.1
C20	QCZ0206-104	C Cap	0.1
C21	QETB1CM-688	E Cap	6800 16 V
C22	QETA1CM-108	E Cap	1000 16 V
C23	QCZ0206-104	C Cap	0.1
⚠ IP1	ICP-F10	IC Protector	
⚠ F1	Refer to the section 2.1	Fuse	
⚠ F2		Fuse	
⚠ F3		Fuse	
CN15	SS30644-008	Connector	
CN16	SM3490-005	Connector	5 Pin
CN18	SS30644-006	Connector	6 Pin
CN19	SS30644-005	Connector	5 Pin
CN20	SS30644-003	Connector	3 Pin
CN21	SS30644-004	Connector	4 Pin

7.16 RM board assembly 16

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Symbol No.	Part No.	Part Name	Description
IC1	SN75188N	IC	TEXAS
IC2	SN75189AN	IC	TEXAS
IC3	HD26LS31P	IC	HITACHI
IC4	HD26LS32P	IC	HITACHI
C1	QCF11HP-103	C Cap	0.01
C2	QCF11HP-103	C Cap	0.01
J2	SCV1469-S09	9 P Connector	9 Pin TO EDITOR
J3	SCV1469-S09	9 P Connector	9 Pin TO CONTROLLER
J4	SCV1147-001	Connector	
J5	SCV1147-001	Connector	
J6	SCV1147-001	Connector	
J7	SCV1147-001	Connector	
J8	SCV1147-001	Connector	
J9	SCV1147-001	Connector	
J10	SCV1147-001	Connector	
J11	SCV1147-001	Connector	
CN17	SS31054-009	Card Fit Socket	9 Pin

7.17 GPI board assembly 17

17□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	PC-827	Photo Coupler	SHARP
IC2	PC-827	Photo Coupler	SHARP
IC3	UPD74HC14C	IC	NEC
Q1	2SC1685(R.S)	Transistor	SANYO
Q2	2SC1685(R.S)	Transistor	SANYO
Q3	2SC1685(R.S)	Transistor	SANYO
Q4	2SC1685(R.S)	Transistor	SANYO
Q5	2SC1685(R.S)	Transistor	SANYO
Q6	2SC1685(R.S)	Transistor	SANYO
Q7	2SC1685(R.S)	Transistor	SANYO
Q8	2SC1685(R.S)	Transistor	SANYO
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
R1	QRD161J-472	CR	4.7 K 1/6 W
R2	QRD161J-472	CR	4.7 K 1/6 W
R3	QRD161J-472	CR	4.7 K 1/6 W
R4	QRD161J-472	CR	4.7 K 1/6 W
R5	QRD161J-472	CR	4.7 K 1/6 W
R6	QRD161J-472	CR	4.7 K 1/6 W
R7	QRD161J-472	CR	4.7 K 1/6 W
R8	QRD161J-472	CR	4.7 K 1/6 W
R9	–	–	
R10	–	–	
R11	–	–	
R12	–	–	
R13	QRD161J-471	CR	470 1/6 W
R14	QRD161J-471	CR	470 1/6 W
R15	QRD161J-471	CR	470 1/6 W
R16	QRD161J-471	CR	470 1/6 W
R17	QRD161J-102	CR	1 K 1/6 W
R18	QRD161J-102	CR	1 K 1/6 W
R19	QRD161J-102	CR	1 K 1/6 W
R20	QRD161J-102	CR	1 K 1/6 W

Symbol No.	Part No.	Part Name	Description
⚠ LC1	EXC-EMT271BT	EMI Filter	
⚠ LC2	EXC-EMT271BT	EMI Filter	
⚠ LC3	EXC-EMT271BT	EMI Filter	
⚠ LC4	EXC-EMT271BT	EMI Filter	
⚠ LC5	EXC-EMT271BT	EMI Filter	
⚠ LC6	EXC-EMT271BT	EMI Filter	
⚠ LC7	EXC-EMT271BT	EMI Filter	
⚠ LC8	EXC-EMT271BT	EMI Filter	
⚠ LC9	EXC-EMT271BT	EMI Filter	
⚠ LC10	EXC-EMT271BT	EMI Filter	
⚠ LC11	EXC-EMT271BT	EMI Filter	
⚠ LC12	EXC-EMT271BT	EMI Filter	
⚠ LC13	EXC-EMT271BT	EMI Filter	
RY1	AG2303	Relay	
RY2	AG2303	Relay	
RY3	AG2303	Relay	
RY4	AG2303	Relay	
RY5	AG2303	Relay	
RY6	AG2303	Relay	
RY7	AG2303	Relay	
RY8	AG2303	Relay	
RY9	AG2303	Relay	
J1	SCV1401-001	14 Pin Terminal	14 Pin
CN13	SC42462-026	Connector	26 Pin
CN17	SS31054-009	Card Fit Socket	9 Pin

7.18 BNC board assembly [1][8]

[1][8]☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
R1	QRV141F-75R0AY	MFR	75 1/4 W
R2	QRV141F-75R0AY	MFR	75 1/4 W
R3	QRV141F-75R0AY	MFR	75 1/4 W
R4	QRV141F-75R0AY	MFR	75 1/4 W
R5	QRV141F-75R0AY	MFR	75 1/4 W
R6	QRV141F-75R0AY	MFR	75 1/4 W
R7	QRV141F-75R0AY	MFR	75 1/4 W
R8	QRV141F-75R0AY	MFR	75 1/4 W
R9	QRV141F-75R0AY	MFR	75 1/4 W
R10	QRV141F-75R0AY	MFR	75 1/4 W
R11	QRV141F-75R0AY	MFR	75 1/4 W
R12	QRV141F-75R0AY	MFR	75 1/4 W
R13	QRV141F-75R0AY	MFR	75 1/4 W
R14	QRV141F-75R0AY	MFR	75 1/4 W
R15	QRV141F-75R0AY	MFR	75 1/4 W
R16	QRV141F-75R0AY	MFR	75 1/4 W
R17	QRV141F-75R0AY	MFR	75 1/4 W
R18	QRV141F-75R0AY	MFR	75 1/4 W
R19	QRV141F-75R0AY	MFR	75 1/4 W
R20	QRV141F-75R0AY	MFR	75 1/4 W
R21	QRV141F-75R0AY	MFR	75 1/4 W
R22	QRV141F-75R0AY	MFR	75 1/4 W
R23	QRV141F-75R0AY	MFR	75 1/4 W
R24	QRV141F-75R0AY	MFR	75 1/4 W
R25	QRV141F-75R0AY	MFR	75 1/4 W
R26	QRV141F-75R0AY	MFR	75 1/4 W
CN9	SC42462-020	Connector	20 Pin
CN10	SC42462-034	Connector	34 Pin
CN11	SC42462-026	Connector	26 Pin
CN12	SC42462-020	Connector	20 Pin

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Symbol No.	Part No.	Part Name	Description
IC1	VC1042	IC	ROHM
IC2	VC1042	IC	ROHM
IC3	VC1042	IC	ROHM
IC4	TA78005AP	IC	TOSHIBA
IC5	HA17012PC	IC	HITACHI
IC6	LR74HC138	IC	SHARP
IC7	NJM082D	IC	JRC
IC8	NJM7809A	IC	JRC
R1	QRV141F-2701AY	MFR	2.7 K 1/4 W
R2	QRV141F-2701AY	MFR	2.7 K 1/4 W
R3	QRZ0052-220	FR	22
R4	QRV141F-6800AY	MFR	680 1/4 W
R5	QRV141F-6800AY	MFR	680 1/4 W
R6	QRD161J-221	CR	220 1/6 W
C1	QER41EM-106	E Cap	10 25 V
C2	QCZ0206-104	C Cap	0.1
C3	QCZ0206-104	C Cap	0.1
C4	QER41EM-106	E Cap	10 25 V
C5	QCZ0206-104	C Cap	0.1
C6	QER41EM-106	E Cap	10 25 V
C7	QCZ0206-104	C Cap	0.1
C8	QCS11HJ-220	C Cap	22 P
C9	QCZ0206-104	C Cap	0.1
C10	QCZ0206-104	C Cap	0.1
C11	QCZ0206-104	C Cap	0.1
C12	QCZ0206-104	C Cap	0.1
C13	QCS11HJ-101	C Cap	100 P
L1	SMV2223	Coil	
L2	SMV2223	Coil	
L3	SMV2223	Coil	
CN1	SCV1196-090	Connector	90 Pin (VIDEO board)
CN2	SCV1196-090	Connector	90 Pin (CP board)
CN3	SCV1196-090	Connector	90 Pin (KEY board)
CN4	SCV1196-090	Connector	90 Pin (WF board)
CN5	SCV1196-090	Connector	90 Pin (KSG board)
CN6	SCV1196-090	Connector	90 Pin (CPU board)
CN7	SCV1196-032	Connector	32 Pin (CP board)
CN8	SCV1196-032	Connector	32 Pin (CPU board)
CN9	SC42462-020	Connector	20 Pin (BNC board)
CN10	SC42462-034	Connector	34 Pin (BNC board)
CN11	SC42462-026	Connector	26 Pin (BNC board)
CN12	SC42462-020	Connector	20 Pin (BNC board)
CN13	SC42462-026	Connector	26 Pin (GPI board)
CN15	SS30662-008	Connector	4 Pin (Y/C board)
CN16	SCV1228-004	Connector	8 Pin (PS board)